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Original Communications.

*NEW THERAPEUTIC AGENCIES.**

LECTURE VII.—ON THE TREATMENT OF DIABETES AND POLYURIA.†

By Professor Dujardin-Beaumetz,‡ Paris, France.

GENTLEMEN:—I finished my last lecture by the remark that to the diuretic treatment counselled in renal insufficiency we might oppose an anuric treatment, meaning a class of medicaments which diminish the urinary secretion. The medicines which constitute this category are all derived from the new group of antithermic analgesics.

But I do not desire to limit my lecture to this subject alone, and I will improve the opportunity to set forth the treatment of a disease in which polyuria is a very prominent symptom. I refer to diabetes. I do this the more willingly because the Committee of Organization of the Berlin Congress has done me the honor to ask me to open the discussion on this subject, and you will find in this lecture the principal points which have served as the basis of my communication.

Be it understood that I do not intend to

* A second series of "New Medications," published in 1887.

† From advance sheets, revised by the author (translated by E. P. Hurd, M.D.). Lectures delivered in Cochin Hospital, Paris, France.

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give a thorough exposition of the treatment of diabetes, and must refer you therefor to my "Clinical Therapeutics"* and "Alimentary Hygiene,"† but I intend to devote this conference to the new acquisitions which the last few years have made to this department of therapeutics. This question of the treatment of diabetes is one of the most interesting subjects in therapeutics, and brings out at once this curious fact that, if the theories of diabetes have considerably multiplied, and we still see the most contradictory opinions maintained concerning its pathogeny, there seems to be unanimous or almost unanimous agreement respecting the treatment, and in particular the dietetic treatment, which should be prescribed for diabetic patients.

The very limitation of the subject before me will be my excuse for not entering into all the questions of experimental physiology and experimental medicine which have lately been discussed, with the end of elucidating the nature of this still obscure affection.

You will permit me, at the same time, to remark how puerile is the distinction once so much insisted upon between diabetes and glycosuria. I am convinced that this distinction does not exist, for if we refer to the latest works on this subject, it seems proved that diabetes is the resultant of a great number of pathological states, and that three organs in particular have to do with this symptomatic aggregate,—the liver, the pancreas, and the brain. It is, then, an accepted tenet that diabetes is always symptomatic, and I do not see any line of demarcation between glycosuria and diabetes properly so called, for diabetes as an essential disease does not exist. It is better, therefore, to abandon the old distinction, and use the terms glycosuria and diabetes synonymously.

The prognosis of diabetes depends entirely on the results which can be obtained by a rigorous dietetic regimen, and this point can be settled in a relatively short space of time. The quantity of sugar voided in twenty-four hours plays in this respect only a secondary part, and a patient who is passing as much as six hundred grammes (twenty ounces) of sugar a day, may have only a mild form of diabetes.

In fact, I hold to the proposition, that any diabetic patient who, after having rigorously followed a severe dietetic treatment for a fortnight, finds that the sugar has entirely disappeared from his urine, may be looked upon as having diabetes in a light form. It is to be understood that we cannot use the word *cure* in reference to these cases, and that it will always be necessary to supervise the diet if we would not see sugar reappear in the urine. But if a rigid dietary regimen be carried out, the patient will likely escape all the consequences and all the complications which attend the diabetic.

When, on the other hand, despite the rigorousness of the treatment, you can only reduce by a minimum quantity the proportion of sugar secreted in twenty-four hours, you may affirm that the diabetes is grave, and that it will pursue a rapid course, and that it will be next to impossible to arrest its progress.

Between the mild and grave forms of diabetes there exists a third form,—that of moderate intensity. To this group belong those patients in whom, notwithstanding the rigor of the treatment, you never succeed in causing the sugar to completely disappear from the urine, and there will always be a quantity equal to ten or fifteen grammes excreted in the twenty-four hours. In these patients, although the prognosis is much more favorable than in the cases of grave diabetes, you will often see supervene at a period possibly far remote from the onset of the disease, cerebral accidents characterized particularly by *ramollissement*. Bouchardat, who has well studied this diabetes of moderate intensity, was one of the first to point out this fact, and in the very numerous observations which I have made I have quite often met with it.

There are still two points on which I desire to dwell before taking up the subject of treatment,—the question of ultimate recovery and that of individual differences in the daily excretion of sugar in the urine.

Can we cure diabetes, or, in other words, can we cause the complete and permanent disappearance of sugar from the urine? Such complete recovery is so exceptional in diabetes that, as a general rule, I believe that if by an appropriate treatment we may banish sugar from the renal secretion, the patient, none the less, keeps a predisposition to glycosuria, so that when once he abandons his strict dietetic regimen, he sees the sugar reappear.

As to individual differences which the secretion of sugar in diabetes presents, some curious facts may be mentioned. There is,

* "Clinical Therapeutics," Detroit edition, article "Diabetes," p. 285.

† Dujardin-Beaumetz, in *Boston Medical and Surgical Journal*, vol. cxv. p. 465, and "Hygiene Alimentaire," p. 175.

first, the difficulty which we find in rendering an individual not predisposed to diabetes glycosuric. In some recent experiments which I have made on the action of glucose as a diuretic, I have shown how difficult it is to render a man or an animal glycosuric. Thus, I have administered from one hundred to three hundred grammes of glucose daily, without ever being able to find sugar in the urine, and I have found it necessary to give to hares a quantity equal to thirty grammes per kilogramme of the weight of the body before the animal became glycosuric. So, then, we have obtained a first fact,—the resistance of certain individuals to the production of even alimentary diabetes.

The second fact is quite as interesting,—viz., that if you can succeed by an appropriate treatment in causing the sugar to disappear from the urine in cases of diabetes, you cannot proportionally augment the sugar in the urine. Let me explain. We will suppose a patient, who, without following any dietetic regimen, voids daily one hundred and fifty grammes of sugar in his urine. You subject this patient to a diet exclusively of starchy food, and this figure of one hundred and fifty grammes of sugar is not exceeded, or is scarcely exceeded, so that with a great number of diabetic patients there is a limit to the production of sugar.

Lastly, a third fact. You will often see in a diabetic patient the return of sugar in the urine, despite the observance of a rigorous alimentary regimen. The most active and important factor in bringing about this return is mental influence of some depressing nature, and in a great many diabetics who, by an appropriate diet, have got rid of their sugar, and in whom, despite the observance of a strict diet, sugar reappears, you may affirm either the existence of too prolonged mental effort or the influence of too powerful emotions.

From what I have just said, you see the necessity of having recourse to frequent examinations of the urine in diabetic patients. In France we have a ready means of making these analyses by the method first brought into vogue by Duhomme;—a method based upon the employment of the officinal dropping-tubes and Fehling's solution. This apparatus, which is of very little cost, enables patients themselves to make quantitative analyses of the sugar,—analyses which, if they have not the exactness of the saccharometer, are at least sufficiently exact for all practical purposes.

After these rather long prefatory observations, I come to the main part of my subject.

The treatment of diabetes is both pharmaceutical and dietetic, the latter being much the more important. Valuable acquisitions have been made to both these departments of therapeutics the last few years, and it is to the critical discussion of these gains that I shall devote this lecture. I will begin with dietetics.

As I have just said, one can accomplish more by diet than by medicine, and everybody is agreed that the suppression of starches and of sugars is the most active of curative agents in diabetes. There seems to be also agreement as to the necessity of giving predominance to fats in the diabetic dietary, and, without adopting the exclusive adipose regimen of Cantani, I would, nevertheless, advise the plentiful use of fatty foods.

The almost absolute privation of starchy foods, and in particular of bread, is one of the most delicate and difficult points in the diet of diabetes. Bread is, in fact, a food almost indispensable; hence the earnest attempts made to replace it by something of a like nature which contains a minimum of starch. Certainly, the introduction of gluten bread into the dietary of these patients was a great progress, and for this we must hold in lasting and grateful remembrance the name of my regretted master, Bouchardat.

Unhappily, there are various kinds of gluten bread, and chemical analysis has shown that there exists in commerce, under this name, bread containing almost as much starch as ordinary bread. We may even say that the more agreeable to the taste the bread made of gluten is, the more it contains of starch, so that very often patients who think they are eating gluten bread, continue to void sugar, which comes from this very aliment.

Hence the endeavor has been made to replace gluten bread by other kinds of bread. I will say but little of the almond bread proposed by Seegen, which we make but little use of in France, but I shall call your attention particularly to *soja bread*.

There is a bean, the product of the *Glycina hispida*, which supplies the Japanese with an article of food much prized and a kind of cheese greatly in demand. This bean is today cultivated in Europe on a large scale. It contains hardly any starch, as is shown by chemical analysis and by the microscopic sections which Blondel has made; but, on

the other hand, it contains a purgative oil,—the oil of soja,—which renders panification very difficult.

At the same time, there is made to-day out of the soja bean, with or without an admixture of gluten, a kind of bread which is liked by many diabetics, and which is superior to the best gluten bread. Unhappily, the special and rather strong taste of the soja will always restrict the use of this bread.

Under the name of fromentine and of legumine, certain pharmacists have utilized the embryos of wheat, of beans, etc. These embryos are to-day easily separated from the grain by reason of the new processes of grinding and of bolting cereals. These embryos contain likewise a purgative oil,—the oil of wheat; this oil, as in the case of soja, renders the panification of this flour difficult. At the same time, some recent tentatives, made by Douliot and by Bouvet, give us reason to hope that we shall succeed with these farinaceous preparations in making a bread deprived of starchy matters or containing but very little; while, at the same time, such bread will be very rich in nitrogen.

If the so-called gluten bread, according to its fabrication, contains variable and often considerable quantities of starchy matters, the same objection may be made to the gluten cakes, into whose composition as much saccharifiable material enters as into ordinary cakes; hence, in my view, they should be banished from the dietary of the diabetic.

In taking for my basis the analyses of Bousingault and of Mayet, I was one of the first to propose the substitution of potatoes for gluten bread. These analyses, in fact, show us that while the best gluten bread gives for every one hundred grammes twenty to thirty grammes and more of sugar, potatoes give only 8.30 per cent. of saccharine material.

But some practitioners, making therapeutic deductions from these analyses, have sanctioned a too free use of potatoes to their diabetic patients. You must remember that it is in equal weights that you should compare gluten bread with potatoes. A good-sized potato when boiled will weigh more than one hundred grammes. If the patient eats several of these potatoes at a meal he will lose all the benefits of this dietary, for one hundred grammes of bread will perfectly suffice for two meals. It will be necessary, then, to limit to one potato—boiled or baked and well buttered—the usage of this vegetable as a substitute for bread in the dietary of diabetes.

It is a similar consideration—that of weight—which leads me to prefer the crust of bread to the crumb. I am aware that the crust contains more saccharifiable matters than the crumb, being composed largely of dextrine, but people eat much less of the crust than of the soft part, and this is especially the case with the diabetic patient, who has generally, by the fact of his disease, bad teeth. So on account of the small bulk which he will consume during the day, you see that it is better to limit your patient to the crust, while at the same time his desire for bread will in a measure be satisfied.

There is another interdiction which is rarely observed by the diabetic,—I refer to the absolute suppression of fruits. The sugar of fruits is of a kind which very readily passes out in the urine of the diabetic; and I have in my practice seen a great many patients who obtained no benefit from dieting by reason of their persistence in eating ripe fruit. Be strict, then, in prohibiting fruits to such patients.

I hold the same view with regard to milk, which I think should be prohibited. One of the most disastrous methods of treatment of diabetes is that proposed by Donkin, who recommended that patients should be subjected to an exclusive milk diet.* I have always seen milk taken in almost any quantity augment the sugar in the urine, and especially provoke polyuria. This is easily explained when you consider the diuretic action of lactose and of the glucoses in general. I would then advise forbidding milk to diabetics. Be it understood that I speak only of diabetes without albuminuria, for when you have the latter complication you will have to weigh the disadvantages of urinary insufficiency along with those produced by the diabetes, and if the former predominate over the latter, you must put your patient on a milk diet.

The choice of drinks is a matter of considerable importance in the dietetic regimen of the diabetic. These patients are, by the very fact of their disease, great drinkers; they are, moreover, individuals who can support without intoxication considerable quantities of alcohol, and this by reason of the functional ac-

* A. S. Donkin, in the *Dublin Journal of Medical Science*, November, 1875. He advised *skimmed milk*, and insisted that the skimmed-milk regimen should be exclusive. He permitted from four to twelve pints in the twenty-four hours, the constipation entailed by this regimen to be combated by an occasional dose of castor oil. This treatment at first had a large vogue.—Tr.

tivity of their kidneys, which enables them to eliminate it readily. You will not, then, be surprised to frequently meet with alcoholism in the diabetic. So, then, it is well to forbid alcohol in all its forms, distilled or fermented, to the diabetic, and if they must take anything of the kind, let it be simply wine and water. My master, Bouchardat, who, in the earlier part of his medical career, counselled pure wine, afterwards saw reason to make a change in this particular, and would permit only diluted wine, all distilled liquors being prohibited.

Patients cannot be too sparing in the indulgence of beer, and all the extracts of malt, indiscriminately, should be prohibited, by reason of the more energetic saccharification which takes place under the influence of those beverages.

Tea, coffee, maté, the preparations of kola, are, on the contrary, very favorable in the hygiene of the diabetic. All these substances have caffeine for their basis, and tend to tone up the often-depressed organism of the diabetic. Hence, I would freely allow these drinks, and the introduction of saccharin has removed the only objection against their use.

Saccharin represents a great progress in the alimentary hygiene of the diabetic, and since I have been prescribing it, I have found nothing but advantages in its employment, without any harm or evil, or, at least, the cases where I have seen gastric pains supervene under the influence of saccharin are so exceptional that they do not disturb the general law.

Thanks to saccharin, we can give all these stimulating drinks in a very palatable form. It may even be put to certain culinary usages, and it has enabled us to do away with the employment of glycerin, which was more or less harmful by reason of the irritation which it produced in one way or another, and the toxic symptoms which may result from its ingestion in large doses, symptoms which Audigé and I have studied under the name of glycerism.

There is one point in the hygiene of the diabetic which is too often overlooked, I refer to that which concerns the hygiene of the buccal cavity. Most diabetics are affected with purulent gingivitis, which may be the starting-point of systemic infection. The researches of Vignal and Galippe have taught us that the buccal cavity contains a great number of micro-organisms, and among them there may be those of an infectious kind, especially if there be any suppuration. Hence, it would be well for you to enjoin your patients to rinse their mouths after meals with antiseptic solutions. The one which has given me the best results is as follows:

Acid. boric., 25 grammes;
Acid. phenic., 1 gramme;
Thymol, .25 gramme;
Water, 1 litre.

Add to the above:

Spirits of anise, 10 grammes;
Spirits of peppermint, 10 drops;
Alcohol, 100 grammes;
Cochineal, q.s. to color. M.

To be diluted with as much water before using.

To prescribe the alimentary and buccal hygiene of diabetics is not enough, you must add other hygienic prescriptions, and in particular gymnastics.

It is known that two great doctrines have been maintained from the point of view of the pathogeny of diabetes. Some authorities, as Bouchard, affirm that diabetes depends on a retardation of nutrition; others, as Lecorché and Robin, that it results from an exaggeration of the functions of organic life.

I confess that, from a clinical, and especially from a therapeutic, point of view, the first of these theories is more captivating than the second. It is, in fact, at the time when the vital functions tend to become enfeebled that diabetes ordinarily appears, and all the observations of Robin were made on old men. As for the treatment, it is in giving a new activity to nutrition that we combat diabetes, and Bouchardat was one of the first to insist upon a special training for the diabetic. All therapeutists are now at one on this point.

Be it understood, this training must not exceed certain limits, and I am of opinion that prolonged fatigues are more injurious than useful to the diabetic.

All kinds of exercise in moderation are favorable, and particularly those which are taken in open air, and especially in the clear air. I recommend, above all, gardening when the patient is capable of it; and, when his social condition forbids horseback-riding, fencing, gardening, Alpine excursions, gymnastics, I advise joinery, which everybody can practise without expense and in a place of small dimensions.

Hydrotherapy, by the harmony which it produces in the organic functions, by the activity which it gives to the cutaneous ex-

cretion, is a precious adjuvant to the hygienic medication, and, save in special cases which contraindicate its employment, I subject my patients to appropriate hydrotherapic practices.

The question of thermal treatment will properly find a place here between the dietetic and pharmaceutical treatment of diabetes. There is little to say that is new about the employment of mineral waters in diabetes, and it is always the alkaline waters—sodic carbonated and arsenical—that occupy the first place in this treatment.

Many explanations have been given as to the beneficial action of alkaline waters in diabetes. I believe that the best is that they act directly not on the liver, but on nutrition in general, and thus do good. I know that some experiments made by Coignard have shown that the alkaline waters have a retarding effect on the transformation by germination of starch into glucose, *in vitro*, but I persist in believing that it is by stimulating the functions of the cells that these waters benefit. At any event, whether employed at the spas or in the form of bottled waters at the table, they should be a part of the daily treatment of the diabetic.

Martineau has given in connection with this alkaline and arsenical treatment a formula which renders good service. It must be understood that this formula does not give the results announced by Martineau, who claimed to have cured thereby sixty out of seventy cases, but the association of carbonate of lithium with arsenic gives, in diabetes of arthritic origin (and the greater number of cases are of such origin), excellent results. Without having recourse to the rather complex prescription which he has formulated, I order the patient to take before each meal, in a tumbler of effervescent alkaline water (Vichy, Hauterive, Vals, St. Jean, or Rigolette), five grains of carbonate of lithium, and I add two drops of Fowler's solution.

But the most considerable progress which has been made in the pharmaceutical treatment of diabetes is connected with the use of medicines from the group of antithermic analgesics. It had already been observed that certain drugs which act on the cerebro-spinal axis, like quinine, had a favorable effect in diabetes, and recently Worms showed the advantages derivable therefrom. The same was true of bromide of potassium, which was so much vaunted by Felizet.

I have, in fact, myself shown that these antithermic medicines possess an elective action on the cerebro-spinal axis, and in particular on the thermogenic centres of the spinal cord, and it is this action which enables us to explain their effects on the animal temperature. I have even shown you that we may group antithermics in three classes,—those which bring down the temperature by acting directly on the nervous system ; those which produce this therapeutic effect by diminishing the respiratory power of the blood ; lastly, those which have a double action on the nervous system and on the blood-corpuscles. We must make use of medicines from the first of these groups if we would obtain a diminution in the urinary secretion, and at their head I place antipyrin. March 28, 1888, I communicated to the Therapeutic Society the first results which I had obtained in the treatment of diabetes with antipyrin, and I mentioned that, in a patient, I had obtained, with the dose of 2 to 3 grammes (30 to 45 grains) a day, not only a diminution in the quantity of urine, but also that of sugar excreted in the same length of time.*

I had been led to make trial of this medicine because, at a previous meeting, M. Huchard had shown that, in a patient who had been passing thirty litres of urine per diem, antipyrin had reduced that amount to six litres.

At the meeting of April 11, 1888, M. Huchard completed his observation, and cited the case of a patient affected with diabetes in whom the quantity of urine, which had previously been ten litres per day, had fallen to 3.9 litres by the employment of antipyrin.† Since then these facts have been confirmed by many observers, and in particular by G. Sée, A. Robin, etc.

Hence, the antithermic analgesics, and particularly those which are addressed to the cerebro-spinal axis, may diminish the secretion of urine, whether the polyuria be from diabetes mellitus or insipidus. You must not make the mistake to confound the polyuria which accompanies renal insufficiency (interstitial nephritis) with diabetes insipidus. In interstitial nephritis the administration of antipyrin to diminish the renal flow would be rather harmful than beneficial.

Still other medicaments have been counselled in diabetes insipidus. Trousseau vaunted valerian. Recently Bucquoi praised

* Dujardin-Beaumetz, "On Antipyrin in the Treatment of Diabetes" (*Comptes-Rendus de la Société de Thérapeutique*, 1888, p. 46).

† Huchard, "On Antipyrin in Polyuria and Saccharine Diabetes" (*Soc. de Thér.*, 1888, p. 46).

the use of ergot of rye,* which he is in the habit of giving in the dose of 4 grains three times a day, and in the case of a polyuric patient, who was passing fourteen litres a day, it brought down the quantity from two to three litres a day.

Despite the experience of Bucquoi, I persist in thinking that antipyrin gives results quite as advantageous.

Is antipyrin the only one of these analgesics that is capable of giving anuric effects? By no means, for we can also obtain them from phenacetin, acetanilide, and exalgin.

So in patients affected with polyuria, whether it be from diabetes, or whether it be essential polyuria, you should always employ these analgesic medicaments, and you will often obtain remarkable effects; if you make choice of antipyrin, give it in doses amounting to from 2 to 4 grammes a day (30 to 60 grains).

Is it necessary to enforce with great rigorousness the diabetic regimen during long months and years? I do not think so. I believe that if, during the first months, you ought to enforce this regimen with extreme rigorousness, after you shall have observed disappearance of sugar, or even a very considerable diminution, in the quantity excreted in the twenty-four hours, you may relax somewhat the severity of the regimen. I have, in fact, often seen this dietetic regimen produce a great enfeeblement in the diabetic, and in numerous cases it has seemed to me that there was only advantage and no loss in keeping the glycosuria at a figure inferior to ten grammes of sugar in the twenty-four hours, and in allowing the patient with his meals a little bread, a few potatoes, or a little fruit.

Such are the principal points to which I desired to call the attention of my *confrères* in the treatment of diabetes.

In this short exposition I have mentioned only the kinds of treatment which have commended themselves to the profession by their results, leaving on one side those whose merits are still contested. But these considerations seem to me to be sufficient to show what favorable influence hygienic therapeutics, and therapeutics properly so called, may have in ameliorating the condition of those who are suffering from one of the most frequent diseases in our modern life.

In applying the rules which I have above stated, if the patient is willing to submit rigorously to these regulations, there is every probability, unless his diabetes be of the grave kind, that there will be disappearance of sugar from the urine, and that he will escape the baneful consequences that result therefrom; this, at least, can be affirmed of the majority of cases. This, it must be admitted, is a great progress.

To sum up what I have just said, we will suppose a case of diabetes of arthritic origin. You will first prescribe the dietetic regimen which is likely to give the best results, along with the lithiated arsenical treatment.

1. Let the patient take before breakfast and dinner 5 grains of carbonate of lithium in a tumbler of Vichy or Vals water; 2 drops of Fowler's solution should be added to each dose.

2. Give after meals, in a little coffee sweetened with saccharin, 1 gramme (15 grains) of antipyrin.

3. Sponge the body all over every day with warm water containing a little *eau de Cologne*. Energetic dry friction with a hair glove after the sponge-bath.

4. Require the patient to rinse the mouth, after carefully brushing the gums, after meals, with the boracic acid mixture above given.

5. Pursue with rigor the following dietetic treatment: A diet exclusively of eggs, meats of all kinds, fowl, game, mollusks, crustaceans, cheese. All green vegetables are permitted except beets, carrots, and turnips.

Urge the free use of fatty foods, such as sardines in oil, tunny-fish with oil, sour herring with oil, pork, butter, *pâté de foie gras*, "*rillettes*," bacon fat, etc. For soups, recommend principally cabbage soups, bouillon with poached eggs, chicken broth, onion soup, mutton broth, clam broth, etc. All these soups should be taken without bread or crackers.

For bread, allow gluten bread, soja bread, fromentine bread; with each meal allow three ounces of boiled potatoes. To sweeten drinks, use pastilles of saccharin. Tea, coffee, maté, kola are permissible.

Prohibit all amylaceous foods, bread, panada, macaroni, rice, pies and cakes, custards, puddings, sugar, sweetmeats, chocolate, preserves, all fruits.

Milk is forbidden, unless taken in very small quantity. All sauces and gravies containing flour are also forbidden.

For drinks, allow with the meals wine diluted with Vals or Vichy water, but little pure wine, no brandy or other distilled liquors.

6. Regular daily exercise to be taken.

* Bucquoi, "Treatment of Polyuria by Spurred Rye" *Soc. de Thérapeutique*, 1888, p. 75).

All bodily exercises are favorable. Insist especially on walks in the open air, mountain excursions, fencing, boxing, joinery.

Such, gentlemen, are the bases on which should be established the regimen of diabetic patients, and I come now to a subject quite as interesting,—namely, the new treatment of tuberculosis.

THE OPERATIVE TREATMENT OF STRICTURES OF THE MALE URETHRA.

By John B. Deaver, M.D.,* Philadelphia, Pa.

BEFORE describing the treatment of strictures of the male urethra, I think it well to mention their classification and location.

The usual classification of strictures are as follows:

1. The linear, bridle, pack thread, or valvular.
2. The annular.
3. The irritable.
4. The resilient.
5. The stricture of large calibre.
6. The stricture of small calibre.

Strictures are also spoken of as permeable and impermeable, depending upon the degree of contraction; permeable when an instrument can be passed through the stricture, and impermeable when the stricture will not permit the passage of an instrument, let it be ever so small.

Location.—There has been a great deal of discussion as to the location of strictures of the urethra. Sir Henry Thompson, Treves, and Keys believe that the most frequent seat of stricture (two-thirds) is beneath the subpubic arch or at the bulbo-membranous junction. Dr. Otis claims that the most frequent seat of stricture is about one-quarter of an inch within the meatus urinarius. In my experience the majority of strictures occur about the middle of the pendulous urethra.

The operations for stricture of the male urethra aiming for a radical cure, in my judgment, are gradual dilatation, only practised as a preliminary procedure to dilating internal urethrotomy, external urethrotomy, and a combination of dilating internal urethrotomy and external urethrotomy.

In determining the operative treatment, I first learn the position of the stricture or strictures; and, secondly, their calibre, this being most accurately as well as conveniently accomplished by the urethral metre. All strictures of large calibre, by which I mean those of eighteen millimetres and over in circumference, when situated not deeper than four and a half inches within the meatus urinarius in the average-sized penis, and five inches in the unusually large penis, are cases for dilating internal urethrotomy.

Strictures impermeable to the passage of instruments (filiform bougies, etc.) are cases for external urethrotomy or perineal section, depending upon their location. Strictures of small calibre, which cannot be dilated to eighteen millimetres by gradual dilatation, and situated within four and a half inches of the meatus urinarius in the average-sized penis and five inches in the unusually large penis, are cases for internal urethrotomy, first using Maisonneuve's urethrotome, with which the stricture or strictures are cut to twenty millimetres, when, with the dilating urethrotome, the calibre of the urethra is easily restored.

Gradual dilatation, by means of conical steel bougies, is the form of treatment most commonly employed by the great majority of surgeons, and for what reason I know not, but hope it is because their patients will not submit to more radical measures, urethrotomy, which beyond any question of doubt, offers the only means of cure. It is true that gradual dilatation will temporarily relieve a stricture, but where is there a surgeon who would promise a cure by this treatment? Except, perhaps, I will venture to say, in very recent strictures, as before organization has taken place: but these are so seldom seen before this process is complete, not having been the occasion of sufficient trouble to prompt the patient to seek the advice of a surgeon; therefore they can practically be dismissed. With this form of treatment, the bougie becomes the patient's constant companion, not for a short time, but for life. How common it is for the patient to be prescribed a bougie, and with one or two lessons taught how to use it, and is advised to pass it himself once every week, or perhaps every other week; this, to say nothing of the ill effect accruing from this treatment, is quite enough to condemn it. Many of us have seen epididymitis, cystitis, abscess of the prostate, and prostatorrhœa, resulting from the passage of the bougie, both in the hands of the surgeon and of the patient. None of these troubles have I ever seen follow an internal or external urethrotomy properly done.

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We will admit that in nearly all cases of stricture treated by gradual dilatation, whether the stricture be in the pendulous urethra or further back, the bougie is passed into the bladder; in fact, the instrument is forced into the urethra up to its hilt by depressing the handle well between the thighs, and is not spoken of as dangerous treatment when compared with urethrotomy. The mediate danger of this manner of treatment I am very certain is of considerable moment, while that of urethrotomy is *nil.*

There is no doubt that with a very small conical steel sound, unless the greatest care be observed when attempting to traverse a tight stricture, there is danger of making a false passage, this being more likely to occur when the stricture is located in the pendulous than in the deep urethra. To some this may seem an adverse statement, but when we recall the fact that the surgeon has better command of the deep than of the pendulous urethra, owing to the relation it bears to the anterior wall of the rectum, with the index-finger, in which (for practical purposes answering the part of a director) it can be positively determined whether or not the sound is following the proper course, it will be readily understood. I am always able to accomplish more with the conical steel sound than with the soft bougie. If from the history and examination of a case like the above I suspect there is a false passage, I make a urethroscopic examination, when, with a probe, I am able to determine positively. It may be very difficult to find the orifice of the false passage, owing to the presence of blood; this can be overcome by swabbing the urethra with styptic cotton.

Continuous dilatation, where a filiform bougie or a small catheter, if the stricture will admit it, is introduced into the bladder, and allowed to remain for some time, generally two or three days, when these are replaced by others of larger size, and so on till the stricture can be disposed of according to the operator's preference,—this treatment is always followed by a strong tendency to re-contraction, to say nothing of its provoking suppuration and often ulceration of the walls of the urethra; certainly three strong objections. In the case of a tight stricture of the deep urethra (causing retention of urine) in a subject well advanced in years, and having every appearance of bladder- and kidney-disease, I have seen the urethra loaded with filiform bougies, and, after persevering for some time, the surgeon has succeeded in passing one through the stricture, allowing it to remain, congratulating himself upon the feat performed, this offering sufficient relief to the distended bladder till the stricture can be dilated to admit the smallest-sized catheter. By this treatment it is a question how long it will be before the bladder is completely emptied, to say nothing of the evil effects of the prolonged retention. These are cases in which I always practise and teach that external urethrotomy should be done, thus fulfilling every indication,—that of relieving the retention, dividing the stricture, and draining the bladder, all of which are urgently called for, but especially so, in the event of existing organic trouble, beyond the urethra.

The treatment by rapid dilatation and divulsion I do not approve of, as by either means we must necessarily occasion a lacerated wound, the latter being much less safe than an incised wound, like that made in the operation of internal urethrotomy. In operations upon the surface of the body, we are careful to have our cutting instruments in such condition as not to do faulty work, knowing how union is interfered with when the edges of the wound are in any way contused or lacerated. Why, then, should we adopt an opposite course when doing a plastic operation, as it were, upon the urethra, to say nothing of opening up more than one channel by which the urine may find its way by infiltration, thus exposing the patient to unwarrantable risk? For one who still believes the above means of treating strictures of the urethra are preferable, safer, and therefore more surgical than by internal urethrotomy, to convince him he is wrong, I would ask him that he make a urethroscopic examination, with the incandescent lamp urethroscope (Leiter), of the portion of the urethra operated upon, when I am confident that this alone would forever disabuse his mind of the fallacy he has been laboring under, if not instilling into the minds of hundreds of medical students, to say nothing of the sequelæ of the divulsion treatment. In a paper on the "Value of the Leiter Incandescent Lamp Urethroscope in the Treatment and Diagnosis of Chronic Urethral Discharges," I had the honor of reading before the surgical section of the American Medical Association, at Nashville, Tenn., May, 1890, and published in the *Philadelphia Medical News* of June 21, 1890, I called attention to the disadvantage of this proceeding, illustrating my remarks by diagrams, which showed tabs of the torn

urethra. The only circumstances under which I practise rapid dilatation or divulsion, but never carried to the extent of restoring the urethra at the seat of the stricture to its normal calibre, are when called to see a patient with a stricture, simple or multiple, of small calibre, seated in either pendulous or deep urethra, causing retention of urine, and when a cutting operation is positively refused. Here I introduce the small-sized Thomson divulsor, if the stricture or strictures will admit it, and stretch it to thirty millimetres. Not being able to engage a divulsor at once, I introduce a filiform bougie, and over this pass the divulsor. Immediately after the divulsion, a No. 20 soft catheter rendered aseptic is passed into the bladder, and retained for forty-eight hours. The bladder is washed out through the retained catheter with either boracic-acid solution or a solution of bichloride of mercury, 1 to 15,000, two or three times a day, depending upon the amount of cystitis present. The retention of a catheter in cases like the above I consider imperative. The treatment by internal urethrotomy is carried out in the following manner: The preparatory treatment consists in an examination of the urine, both chemically and microscopically, when, if the case be a suitable one for operation, the internal administration of boracic acid, 10 grains, is given four times daily; attention to the bowels, a laxative being given, if necessary; irrigation of the urethra with a 1 to 15,000 solution of bichloride of mercury three times daily; this to be instituted and pursued for four days previous to the operation.

The technique of the operation is described in the report of the cases. The after-treatment consists in the internal administration of boracic acid and two grains of bisulphate of quinine four times daily for three or four days; urethral injections of either boracic acid, grains 5, to 1 ounce of distilled water, or solution of bichloride of mercury, 1 to 15,000, for one week, when, if there is still present some discharge, the urethra is examined urethroscopically, and treatment directed according to the indications. The passage of a bougie of the calibre of the urethra at intervals of four days is continued for four weeks. The complications of internal urethrotomy usually described are hemorrhage, extravasation of urine, urethral fever, spongio-corporitis, and abscess of the prostate. If the rules relative to the distance from the meatus in the division of strictures by internal urethrotomy be closely observed, and the retention of a full-sized aseptic soft rubber catheter in the bladder for twenty-four hours after the operation and the division made with the dilating urethrotome, hemorrhage to any extent should not occur. The superiority of the dilating urethrotome over Civiale's instrument, the one so largely used, and all others of this class, a point which will be referred to later on, is the exactness with which the incision is made, and the depth of the incision required, owing to the strictured tissue being rendered tense (thinned out) by dilating it prior to cutting. By confining the incision to the strictured portion of the urethra, coupled with the introduction of the soft catheter, the likelihood of extravasation is prevented. If the precautions are taken as advised, to secure thorough asepsis, urethral fever will not occur. Curvature of the penis to a slight extent will follow this operation in a small number of cases, I care not how carefully the operation is done. In this connection I can do no better than refer to the second series of cases, numbering one hundred and eighty-six, reported by Professor F. N. Otis, where incurvation of the penis occurred as follows:

Slight, and lasting for a short time only	3
Slight, and lasting for one and a half months	1
Slight, lasting four months	1
Slight, lasting one year	1
Total	6

The treatment that will be found most satisfactory in this complication is massage and the local use of an ointment of mercury and belladonna. By retaining the soft catheter for twenty-four hours following the operation, retention is less liable to occur than if the urine be drawn. Spongio-corporitis I have never had follow the operation, and I believe when it does occur it is the result of faulty antisepsis. By confining the bougie, passed for the purpose of preventing recontraction, to the pendulous urethra, and the observance of strict asepsis, abscess of the prostate gland will not be met with. The advantage of the dilating urethrotome over all instruments for the internal division of strictures of large calibre of the pendulous urethra are the following: 1, the adaptability to accommodate itself to a stricture of the size between twenty and forty millimetres; 2, the exactness with which the stricture can be located and divided; 3, the very small incision necessary for the complete division of the same, being able to render the stricture tense; 4, being able, without any question of doubt, to divide all

strictured bands, the latter qualification particularly not being possessed by any other instrument. The adaptability of the dilating urethrotome to any stricture of the calibre between twenty and forty, holds the same relation to other instruments as does the urethrameter to bulbous bougies,—*i.e.*, that the urethrameter will accomplish what will otherwise require a series of twenty-two bulbous bougies. In addition to being able to locate accurately a stricture in the pendulous urethra of the calibre of eighteen millimetres and above, with the urethrameter, we are able to measure its calibre as well as its length, and by this means determine the length and depth of the incision required to divide it. I would not advise internal urethrotomy in the case of a stricture of large calibre in one the subject of a hemorrhagic diathesis, of advanced kidney-disease, or in one advanced in life. In the case of a stricture of small calibre, where either of the above conditions are present, I do not think it prudent to adopt radical operative means, unless the stricture is the source of much trouble. If the patient is of a bleeding family, I would simply practise gradual dilatation, but otherwise would divide the stricture under cocaine, believing this preferable, under the above circumstances, to the administration of an anæsthetic. Strictures of small calibre in the pendulous urethra that cannot be dilated to admit the Otis urethrotome, but which will admit the filiform bougie of Maisonneuve's urethrotome, can be divided by this instrument, thus allowing the passage of the dilating urethrotome, when it can be disposed of as an ordinary stricture of large calibre. This I find safe, and much more acceptable to the patient than an external urethrotomy. In all strictures of large calibre, whether made such by the preparatory urethrotomy, with Maisonneuve's urethrotome or not, and situated not deeper than four and a half inches from the meatus in the average-sized penis, and five inches in the unusually large penis, I believe dilating internal urethrotomy to be not only the surest and the most speedy way of treating the same, but the only way that will offer the patient a means of permanent cure.

The operation of perineal section and external urethrotomy can be done in one of several ways, the technique of which depending upon the permeability of the stricture to the passage of an instrument. When the stricture will admit, it is the custom with many surgeons to introduce a guide (Gouley, Symes staff, or, if these be too large, a filiform bougie), in this way facilitating the operation. Should this not be feasible, a medium-sized staff or conical steel sound is passed down to the face of the stricture, and the urethra opened by cutting down upon the point of the instrument as the guide. The stricture is then divided from before backward. My method of performing perineal section and external urethrotomy for stricture is without a guide, exposing the urethra behind the stricture by a careful dissection, when it is opened and the stricture divided from behind forward. This is undoubtedly a safer method—there being no question about finding the urethra if we are perfectly familiar with the anatomy of the part operated upon (which I maintain every surgeon should be)—than to cut down, being guided by so small an instrument as a Gouley, Symes staff, or a filiform bougie, engaged, as it is thought, in the stricture, but as likely to be in a false passage. Is not the recognition of the tissues a more reliable guide? Exceptions may be taken to the above when the perineum is extensively infiltrated with urine. I recall a case of traumatic stricture of the membranous urethra following a fracture of the ramus of the ischium, the result of direct force, which I operated upon in the University Hospital two years ago. I am quite sure, if I had not operated in this way I would not have succeeded without at least endangering the life of my patient. This case made a speedy recovery, not having had a bad symptom. The urethra being opened and the stricture divided, a soft catheter is introduced into the bladder through the urethrotomy wound and retained. A drainage-tube, full size, is passed through the urethra to the urethrotomy wound, where it is brought out; this, with the catheter in the bladder, is allowed to remain four days. By means of the catheter and the drainage-tube, both bladder and urethra are kept aseptic by frequent and thorough irrigation of a solution of bichloride of mercury, 1 to 15,000. After the removal of the catheter and the drainage-tube, the treatment consists in passing a conical steel bougie of the calibre of the urethra through the meatus to beyond the stricture every third day till repair is complete.

The terms perineal section and external urethrotomy have distinct meanings, the former referring to a section of the urethra made from without and posterior to the perineoscrotal junction, the latter to a section of the urethra anterior to this point. The only com-

plication of any moment in a perineal section or external urethrotomy is hemorrhage, which, I believe, is less likely to occur when the operation is done by dissection, this enabling the operator to see and tie all bleeding points. In the event that the bleeding continues after the operation is completed and the patient put to bed, it can, in the majority of cases, be controlled by packing. Yet I recall one case where there was internal bleeding (into the pelvis), notwithstanding the above precautions were taken. What is the explanation of blood finding its way into the pelvis? So long as the membranous urethra is not trespassed upon, there is no danger of bleeding taking place into the pelvis, blood being prevented from finding its way there by the attachment of the anterior layer of the triangular ligament (deep perineal fascia.) When the space between the anterior and the posterior layer of the triangular ligament is opened up, as must of necessity be done when dividing a stricture of the membranous urethra, a communication is established between the muscles (levator ani coccygeus and pyriformis), forming the floor of the pelvis and the pelvic fascia, which latter is continuous with the posterior layer of the triangular ligament (deep perineal fascia). The case above referred to was one of stricture of the bulbo-membranous junction, for which I did a perineal section some years since, and where hemorrhage took place into the pelvis, forming a blood clot most pronounced in front of the bladder; the clot underwent suppuration, causing septicæmia, from which the patient did not recover for three months.

CASE I.—*Internal Urethrotomy.*—J. H., white, aged 32, was admitted to the male venereal wards of the Philadelphia Hospital, complaining of difficult micturition. Gave a history of several attacks of gonorrhœa. The stream of urine passed was small, and there was a gleety discharge. Examination of urine was negative. A No. 20 F. conical steel bougie could be passed with some difficulty, occasioning patient considerable pain.

Examination of the urethra with the urethrameter showed its calibre to be forty millimetres, calibre of the meatus twenty-eight millimetres, and the presence of three strictures, respectively, three-quarters, two and a half, and three inches posterior to the meatus. The patient giving his consent to an operation, 10 grains of boric acid t. d. was given internally for five days previous to the operation. On October 4, 1889, he was brought before the clinic, and 10 grains of quinine were administered; was anæsthetized, ether being used. The first procedure was the restoration of the meatus to the calibre of forty millimetres. Having located the anterior stricture, I then passed the Otis dilating urethrotome, so as to engage it, and dilated it until it met with resistance. The concealed blade was then drawn through the stricture. After division, was able to expand the blade up to forty millimetres, the normal calibre of the urethra. This procedure was repeated with each of the remaining strictures in turn. Having divided these, I then introduced the urethrameter down to the bulbo-membranous junction, when it was expanded to forty millimetres, and then easily withdrawn, all obstructive points having been divided. The urethra was washed out with a 1 to 15,000 solution of bichloride, a soft catheter introduced into the bladder, which was allowed to remain for twenty-four hours. Before removal from the operating-table a one-grain opium suppository was introduced. His recovery was uninterrupted, the temperature at no time reaching 99°. A No. 40 F. bougie was passed every fourth day for four weeks, when, there being no longer any discharge, the patient was discharged cured.

CASE II.—*Internal Urethrotomy.*—S. S., transferred from the nervous to the surgical wards of the Philadelphia Hospital on September 16, 1889, with the diagnosis of stricture. Had gonorrhœa fifteen years ago. For the last three years noticed his stream decreasing in size. When admitted to the nervous ward a No. 15 F. bougie could with difficulty be passed. When referred to the surgical ward his urethra was gradually dilated, until a No. 21 F. bougie could be introduced.

Measurements.—Circumference of penis, three and three-quarter inches; calibre of urethra, thirty-five millimetres; of meatus, twenty-three millimetres; of stricture, twenty-one millimetres; depth, three inches from the meatus.

He was prepared by the routine administration of boric acid internally, 10 grains t. d. Previous to the operation 10 grains of quinine sulph. and $\frac{1}{8}$ grain of morphine sulph. were given.

Operation, September 25.—Stricture cut as in Case I. Temperature before operation, 99$\frac{3}{5}$° F.; after operation, evening, 98$\frac{4}{5}$° F.

The night following the operation the patient removed the catheter; his temperature rose to 101$\frac{2}{5}$°; catheter was reintroduced under antiseptic precautions; quinine was

administered. After this his temperature dropped to 101, and on the morning of September 26 was 98¾°. On the evening of the 26th the catheter was again removed by the patient, his temperature rising to 101⅝°; was treated as on former occasions. After this no difficulty was experienced. One month after the operation a No. 36 F. bougie could be passed with perfect ease.

CASE III.—*Internal Urethrotomy.*—S. T., white, aged 47, a hemiplegic, was transferred from nervous to surgical ward of the Philadelphia Hospital for urethral treatment. The examination revealed as follows: Circumference of penis, three and a half inches; calibre of urethra, thirty-four millimetres; of meatus, thirty millimetres. One stricture was found three inches from the meatus. The patient had some difficulty in urinating, but not a great deal; complained chiefly of reflex symptoms, which were thought to be due to the condition of the urethra. The patient having been prepared as in Case I., and the stricture and meatus divided in the same manner, a No. 34 F. sound was passed through the stricture without any difficulty. A catheter was passed into the bladder and secured. An opium suppository introduced into the rectum and patient returned to bed. Same after-treatment given as in the two previous cases. Four weeks after the operation recovery complete.

CASE IV.—*Interno-External Urethrotomy.*—J. W., aged 42, white, was admitted into the venereal ward of the Philadelphia Hospital suffering from periodical attacks of retention of urine, with a history of having had several attacks of gonorrhœa and a stricture. Had external urethrotomy performed some time since; the wound was entirely healed at time of entrance into the hospital. On examining the case, a cicatrix was found in the perineum, corresponding to the site of the former operation.

Measurements.—Circumference of penis, three and a half inches. Examination by the urethrameter gave a urethral calibre of thirty-three millimetres; meatus, twenty-eight millimetres; and the presence of two strictures in the pendulous urethra, situated two and a quarter and four inches posterior to the meatus, of the calibre of twenty-eight and twenty-six millimetres, respectively. The calibre of the stricture in the deep urethra was not measured.

I explained the condition of affairs to the patient, and advised radical treatment, to which he gave his consent. An examination of the urine was negative. Boric acid was given internally for four days previous to the operation. The patient received 10 grains of quinine sulph. prior to the administration of ether. The strictures in the pendulous urethra was disposed of as in Cases I., II., III. I then divided the stricture in the deep urethra by perineal section. The incision began at the junction of the scrotum and perineum, and was continued backward about two inches, taking as my guide the perineal raphe, going through the cicatricial tissue resulting from the former operation. I found the landmarks in this case entirely obliterated; the perineum was infiltrated by the products of inflammation. Cutting through the cicatricial tissue, being careful not to deviate from the median line, I readily exposed the urethra behind the stricture, which was opened and the stricture divided. An ordinary aseptic drainage-tube was passed through the pendulous urethra, and brought out at the perineal wound. A catheter was introduced into the bladder from the perineal wound, and held in position by a suture; the pendulous urethra and bladder were flushed with a 1 to 15,000 bichloride solution; the free ends of the drainage-tube were fastened together with a safety-pin. Iodoform was freely used in the perineal wound, which was then packed with iodoform gauze, an opium suppository introduced into the rectum, and an antiseptic dressing applied. Patient returned to bed. The packing was allowed to remain for three days; when removed, the wound was free from pus and aseptic, the urethra and bladder were irrigated, and the drainage-tube and catheter removed; a No. 33 F. bougie was passed. This was repeated every third day until the wound in the perineum was entirely healed, which required six weeks, the drainage-tube and catheter only remaining in three days. Patient left the institution cured.

CASE V.—*External Urethrotomy.*—W. J., aged 17, white, was admitted to the surgical ward of the Philadelphia Hospital suffering from retention of urine. Gave a history of having fallen astride a rail when thirteen years of age. On entrance to the hospital an attempt to pass a catheter by my resident failed. Neither was he able to pass a filiform bougie. Failing myself to pass an instrument, I had the patient etherized. Under the influence of the anæsthetic I succeeded in passing a No. 12 conical steel bougie, French scale. As the patient desired permanent relief, and the stricture (traumatic)

was situated in the deep urethra, I performed perineal section. An incision, beginning at the junction of the scrotum with the perineum, was carried back in the median line or the perineal raphe for two and a half inches, when, by a careful dissection through the deep structures, the urethra, which was infiltrated to a considerable extent with inflammatory material, was exposed. A small opening was now made in the urethra, through which a grooved director was passed into the bladder, from which passed a large amount of urine. The opening in the urethra was extended anteriorly through the stricture. A sound, No. 40 F., could now be passed through the urethra and into the bladder. From the perineal wound a catheter was passed into the bladder, which was held in place by a suture; a drainage-tube passed through the urethra; the wound thoroughly irrigated, dusted with iodoform, and packed with iodoform gauze; a suppository of 10 grains of quinine and 1 grain of opium was introduced into the rectum, the wound dressed antiseptically, and the patient placed in bed. The dressing was allowed to remain for four days, when the packing with the catheter was removed, and both wound and bladder thoroughly irrigated with a solution of boric acid. A sound, No. 40 F., was passed with the same ease as at the time of the operation. The wound was again lightly packed and dressed antiseptically. The patient was dressed every three days, and a No. 40 F. bougie passed at the time of the dressing. Five weeks and three days after the operation the wound in the perineum had entirely healed. There was no difficulty experienced in passing a 40 F. bougie. The patient was discharged cured.

SOME OBSERVATIONS UPON THE GASTRO-INTESTINAL DISORDERS AND THE DIET IN PULMONARY PHTHISIS.

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IN the therapeutics of pulmonary phthisis no class of intercurrent affections is of greater significance to success or otherwise, and none require so frequent attention, as do those which I propose to consider in this paper. The problem of their prevention or removal is never to be ignored, and without the greatest vigilance these complications are almost sure to arise sooner or later, sometimes as most formidable obstacles to improvement, and not infrequently as a determining cause for a fatal result.

In many cases obstinate disturbances of the digestive organs precede, or seem to precede, the actual development of the lung-affection by considerable periods, possibly idiopathic in their nature, but more likely as symptomatic expression of the incipient disease, for the time beyond our diagnostic resources.

Although believing that any long-continued gastro-intestinal derangement may, by reason of interference with general nutrition, under favorable circumstances, become a predisposing factor to tubercular infection, I cannot ignore the fact that, in the majority of what may be called idiopathic cases, even when continuing for years and leading in time to severe constitutional impairment and cachexia, tuberculosis does not follow; and I incline more and more to the belief that the cases of so-called pretubercular dyspepsia or pretubercular constitutional decline are symptomatic of incipient disease, as a rule due to infection of the alimentary canal.

The increasing evidence of the unsuspected consumption of tubercular food products, derived from infected and, perhaps, still apparently healthy animals, and the liability to infection of the intestinal tract from tubercular secretion, through the various mediums of common use, such as eating-utensils, napkins, glasses, common drinking-cups in public places, dental instruments (tubercular patients are frequent visitors of dental offices), etc., leaves little doubt that tubercle bacilli find entrance to the digestive organs very frequently; and adding to this the fact that it is impossible to positively diagnosticate the earlier changes resulting from tubercular localization upon the intestinal mucous membrane, or in the mesentery, lymphatic channels, and absorbent vessels, I believe that primary infection of the alimentary canal is perhaps not so infrequent as has heretofore been held.

I believe this the more, since, upon closer study, I find that the development, symptoms, course, final outcome, and reaction to usual modes of treatment are apparently different from others, and perhaps peculiar to these cases; and, although I have but a limited number of recorded cases, observed in a more critical light, and with strong suspicion

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of their peculiar features and origin, my records of previous cases with termination in phthisis, together with my memory, confirm me in my conclusions.

In the majority of my cases, all from private practice, the records show that the digestive disturbances had their beginning in what was claimed to have been "the midst of good health,"—at any rate, without having previously suffered of dyspepsia. They were all young subjects, sometimes with and at other times without direct hereditary predisposition. Both subjective and objective symptoms on the part of the digestive organs were entirely out of proportion to the constitutional decline, which was manifest in rapidly-resulting profound anæmia, great loss of strength and flesh, occasional and irregular slight elevation of temperature, and the ineffectiveness of all management, diet, and medication was most constant; yet anorexia, vague and undefined distress in stomach and bowels after eating, constipation, sometimes alternating with diarrhœa, meteorism, seldom nausea, were all that the patients complained of directly. The tongue was seldom coated, physical examination of the digestive organs negative, and in several cases the beginning of some acute illness, like typhoid fever, was noted as being suspected on first consultation.

In all but the three last cases all sorts of treatment, directed to the digestive organs and the general decline, were adopted, and the changes from one plan to another seemed characteristic in their failure to give relief. Pepsins, maltine, arsenic, stimulants, bismuth, acids, alkalies, castor oil, mercurials, salines and other laxatives, iron and bitter tonics, elixirs and wines of this and of that, liquid foods, solid foods, beef peptones and other artifices, meat juices, milk diet, beef diet, and no diet, mineral waters, rectal feeding, oxygen-inhalations, exercise, rest, all to no purpose, seldom a little better, frequently growing worse, or no improvement, are the notes appended to these cases; examinations are recorded of the lungs, the heart, the liver, the spleen, the stomach and bowels, the pelvic organs, the nose and throat, the urine, the fæces, as a rule with negative results. If anything had been thought to have been found, like some affection of the throat, uterine displacement, leucorrhœa, or a hemorrhoid, its treatment had no influence. The only constant finding was the increasing anæmia and diminution in number of red blood-corpuscles, and its treatment was unsuccessful. The outcome was in the course of some six months, seldom later, a pulmonary phthisis, once tubercular peritonitis, and the last three cases recovered.

Well pronounced gastric catarrh was not present, at least not in the beginning, but resulted several times from heroic medication, nor was there evidence of lack or perversion of the gastric secretions. I frequently tested the contents of the stomach by Ewald's method without obtaining any clue, the washing of the fasting stomach only occasionally showed a few remains of food or a little mucus.

It is certainly not the rule that such apparently non organic disease of the digestive organs proves so thoroughly obstinate, or that in such obstinate cases we cannot find more tangible evidence; indeed, after having had a few of such cases, I knew what was eventually coming, after having been so completely baffled and outwitted, and I never was mistaken.

The three last cases treated, and which apparently escaped their fate, did not, however, do so by mere chance and accident. The usual means employed had been equally ineffectual, and considerable inroads upon their health had already occurred, when, under the suspicion of beginning phthisis, I adopted what may be called superalimentation, and, to give them a full chance, I also administered creosote in the first two cases for a considerable period, and in increasing doses to 24 minims per day.

I feel, however, inclined to give the credit to the forced diet, as the improvement set in earlier than could be expected from any specific medication in the period of small doses, and because the last case recovered under the diet alone.

In the diet of these cases all artificial foods were excluded, and preference given to a plain, simple, mixed diet, in which the hydrocarbons were considerably in excess of the physiological standard, consisting of milk, eggs, butter, bread, rice, boiled cereals, sugar, fruit, and beef (the latter only once a day). The patients were urged to take as much as possible, despite the existing anorexia, or the complaint of fulness, meteorism, etc., but frequently recourse had to be had to feeding with the tube, especially in one case, which absolutely refused to take a sufficient amount of food, for the first few weeks of such management. The stomach was washed out in all cases once a day in the beginning, and less frequently thereafter, until substantial gain was made, and less discomfort was noted after eating. Large quantities of food were thus given—for in-

stance, from two to three quarts of milk, the yolks of four to eight eggs, three large saucers of rice, oatmeal, imperial granum, or cracked wheat, with milk and sugar, a number of slices of bread and butter, about six ounces of scraped beef, occasionally some boiled ham, frequently three or four large baked potatoes with plenty of butter—in the course of twenty-four hours. We, of course, had to begin with smaller quantities, but the amounts above indicated were reached, and sometimes exceeded, in the course of two or three weeks, and kept up thereafter with as much variation as was possible to suit the inclinations of the patient.

The bed was kept absolutely for the first month, and massage substituted for exercise.

When the tube was used for feeding, milk, yolks of eggs, sugar, sometimes gruels of cereals, and scraped beef were chiefly depended upon.

In each case the cure was completed within three months, and appetite and relish for food was noted, especially after the anæmia had partially subsided and the patient had made material gain in flesh, and was allowed to be up. During the latter part of the management the patients were allowed to eat in amount according to their inclination, having reached their normal weight. In two of the cases well marked phthisical family history existed. All three patients are well and free from lung symptoms at the present time, after fifteen, eighteen, and thirty months, respectively, since having been discharged.

It is, of course, beyond demonstration that these cases would have subsequently shown manifest tuberculosis had they been managed otherwise, or that their symptoms and decline would not have been arrested by other means, or would not have improved in the end, and such objections may be urged in any case, tending to follow an unfavorable course, when, by some means or other, disaster is averted. I can only say that they seemed to present the same symptomatology and course, and the same obstinacy to all usual methods of treatment, as did the preceding cases which ended in phthisis.

In my present field of labor I see little of incipient tuberculosis, and my opportunities for further investigations are therefore limited, and I call attention to my past experience, particularly in the hope that others may take up the matter in order to determine if the cases described and their peculiar features are not really due to incipient disease, due to tubercular infection of the alimentary canal.

In now speaking of the gastro-intestinal disturbances as they occur in the course of the established pulmonary phthisis, I propose to confine myself to those of the stomach and bowel, which are still, at least in a degree, amenable to our therapeutic resources; and, although recognizing the importance of disturbances in any of the organs lying within the portal circulation, to limit my paper I shall refer to them only incidentally.

I have already stated, in the beginning of this paper, that success in the treatment of phthisis depends, other things being equal, upon the integrity of the organs of digestion and assimilation, and when these are hopelessly diseased, as from glandular atrophy and inveterate catarrh, amyloid degenerations, fatty or tubercular liver, extensive tubercular processes of the intestine, and infiltration and plugging of the lymphatic channels, mesenteric glands, etc., nutrition becomes impossible, and the case must end fatally on account of such complications alone.

One of the most frequent causes of temporary loss of appetite in the course of phthisis is fever; and, apart from its proper management, much circumspection in diet of such fevering patients is essential to prevent rapid loss of flesh on one side and the ill consequences of acute indigestion on the other. Occasionally it happens that fever patients eat heartily, but in these also the digestive organs will finally fail if their diet is not properly regulated. Milk, with the well-cooked and thoroughly-boiled grains, bread and butter, soups and gruels, occasionally a soft-boiled or raw beaten egg, and, according to the state of the bowels, with the addition of stewed fruits, should be chosen from for periods when the temperature is rising or at its maximum; and heartier meals should be given only after well-marked decline of fever and during the afebrile hours of the day. During fever it is best to feed little and often, as an overloaded stomach or larger quantities of nitrogenous food are almost sure to increase and maintain a higher temperature for at least several hours after meals. Sooner or later such errors in diet will lead to uneasiness, meteorism, and diarrhœa, with or without colicky pains, with consequent rapid loss in flesh and strength. Under close observance of the above rules I have in many of my cases been so fortunate as not only to prevent serious loss, but also to maintain the

weight, or even to increase it, during protracted fever.

Another cause of digestive disturbances lies in physical and mental overexertion. Whatever amount of exercise may be permissible, there should always precede and follow a sufficient amount of rest for each principal meal. Such rest need not confine the patient to the house or room, especially in a favorable climate. Under no circumstances, however, should a patient eat heartily when fatigued. In a recent paper on the detrimental effects of overexertion in pulmonary phthisis, presented by myself to the American Climatological Association at the session in Denver, Col., I have shown the frequent loss of appetite and subsequent nutritive disturbances as the results of overexertion observed by me, and have no doubt that other physicians have had similar experience.

In this connection I desire to warn, especially female patients, of tiresome toilet-preparations for meals or for their appearance in the public rooms of fashionable hotels at health resorts. Such hotels are for this and many other reasons unsuitable for residence of patients who seek recovery from pulmonary disease.

The returning appetite, after subsidence of acute processes and complications, and when, under favorable circumstances, real and continuous improvement would follow and perhaps continue; and also the increased desire for food, so frequently seen in patients immediately upon their arrival at elevated climatic resorts, often become a snare, and lead to gastro-intestinal complications, and indirectly to relapses of acute processes, when the digestive powers are not equal to the tax imposed by patients reduced in general health, but who are delighted to experience again a desire for food.

Unless, under such circumstances, the quantity and quality of food taken is promptly regulated for each individual case, and an increase allowed but slowly, there is nothing surer than a loss of all the gain that has been made, and often of much more, during the time the digestive organs were tolerant of such abuse. But few patients realize the need of circumspection, or are able to govern themselves sufficiently, when, after long indifference to food, they again realize a keen relish, and often their desire to gain rapidly in flesh and strength gets the better of their judgment, even when the danger has been pointed out to them.

In improving patients who have but little or no fever and are eating well I have often observed the tendency to treat themselves to favorite dishes or to eat immoderately of them. These patients must be made to understand that they eat for health, and that they cannot afford to trifle with their digestive organs. I well remember a patient who was doing very well indeed, and who acquired a serious gastro-intestinal catarrh from "candy and peanuts," from which she did not recover for nearly a month, during which active lung symptoms with subsequent destructive changes also occurred, and led to a fatal issue. I can see no reason why this patient should not have continued in her improvement had the treat of candy and nuts been avoided. In another case, with similar results, it was watermelons and sweet cider, and I can give a number of such instances.

The diet in such cases should always be simple, and as long as increase in flesh is desired, the hydrocarbons should predominate. After the patient has reached his natural weight, and when more active physical exercise is allowable, the nitrogenous foods should be given to the full physiological standard. In no case which is steadily gaining is it essential, or even best, to select such foods which are believed to require the shortest time for digestion, and predigested and artificial foods at such periods are positively harmful.

The food, as exercise is increased, must have some "staying quality," and need not, so to speak, melt in the mouth. Sirloin and round steaks are then preferable to tenderloins and sweetbreads, and good roast beef to delicate birds and spring chicken. Ham and eggs are well borne; indeed, boiled ham I have found to have been well digested when I found as regularly in the washings of the stomach the undigested particles of quail.

Artificial food products, even if they contain all the elements which their labels claim, and are ready to enter the circulation at once when reaching the stomach and bowel, as is said of most of them, can only be of use when the digestion of other food has been found impossible; then they should be given in very small quantities, and every fifteen or twenty minutes, to derive the best results. It would certainly be unwise and wasteful to at once flood the circulation with larger quantities of food products than can be oxidized and assimilated; and, when nature made the digestion and absorption gradual, and extending to from one to

six hours, she meant continuous nutrition and appropriation rather than a momentary flooding, so to speak, which would fall short of oxidation, and simply prove an additional tax in their elimination.

When food is given, the digestion and absorption of which requires but little time, it must be given in smaller quantities, relatively oftener; and a mixed diet for patients free from fever, who take three regular meals, should be so chosen that, besides the readily-digested articles, there should be also those which require a longer time for digestion, so that the absorption be not excessive at one period and "nothing" for a number of hours before the next meal, but equal and continuous for all the hours to shortly before the next meal, allowing physiological rest for a portion of the night-time. The consumption of large quantities of fluids with meals should always be avoided, especially by patients who eat well of solid foods; it is positively injurious for them to drink from two to six glasses of iced milk, and then eat a regular and hearty meal in addition. I prefer, however, one glass of milk to a glass of water, if only a moderate meal is taken, and recommend to drink frequently of water between meals.

These details are of great importance, if we desire the best results in nutrition, and I believe that I succeed best by observing them. At any rate, it is a rare thing for my patients not to gain steadily and surely in flesh and strength under such management, and the exceptions occur only during active disease and complications, and when in the arrested disease the respiratory surfaces have been so diminished by fibroid and cicatricial changes that the respiratory capacity is far below par. In such patients the quantities of blood and amount of flesh accommodate themselves to the powers of oxidation; with increasing shrinking, they lose in flesh in proportion as the vital capacity is diminished, and this in the absence of all fever and other complications, in the presence of a good appetite and no matter how much food we may give. The excess of food taken is then shown by two or three large evacuations per day, and by the appearance in the urine of evidence of imperfect or partial oxidation.

If we succeed by the use of the pneumatic cabinet to increase the vital capacity, or, by the administration of oxygen in the form of inhalations, oxygen bath, oxygenated water, or rectal oxygen enemas, to temporarily augment the quantity of the blood, we see a corresponding increase in body weight; the former treatment being preferable, as it removes the cause, but the oxygen may be used in conjunction, with the hope to prevent further loss, until the effects from the pneumatic treatment are obtained.

A most prolific source of indigestion, first temporary and finally leading to gastric catarrh, is the indiscriminate use of alcoholic stimulants. In the management of phthisis these must always be looked upon as medicaments, and require for their administration the existence of a definite indication, when the dosage needs to be directed by the physician, and the quality and time of administration chosen, the same as is the case with other drugs. It is simply absurd to tell a patient to take all the whiskey he can. I have known cases who, under such advice, succeeded in taking a quart a day, and much to their detriment. That occasionally a case improves while taking whiskey is quite to be expected, and more still would it be benefited if the administration of it would be reserved for time of need, and the amount given governed by the effect upon the circulation and digestion.

Gastric catarrh never improves as long as large doses of strong alcoholics are given; on the contrary, it grows worse, and I have made it a rule never to make use of whiskey or brandy in such cases. Their withdrawal is often all that is necessary for improvement. If stimulants seem indicated, rest and ingestion of more food soon obviate their need, and only in extreme cases, in the partial collapse with subnormal temperatures, do I give them, and then per rectum when severe gastric catarrh is present.

To aid the digestive organs, and perhaps oftener to comply with the wishes of patients who have been accustomed to wine or beer with their principal meal, I allow a glass of red Hungarian or light Rhine wine, and, really, I have seen patients who seemed to eat and digest better with the wine than without it. When wine or beer is taken with a meal, it must be to the exclusion of other fluids, including milk and coffee.

Chronic gastric catarrh, as such, requires most painstaking management of diet, and frequent washings through the tube to get any improvement. Rest of the digestive organs, by greatly limiting or temporarily withdrawing food, is not to be thought of in phthisis, and I have never succeeded that way in any case. On the contrary, the amount of food must, as a rule, be increased, even under the protest of patients, and fermenta-

tion prevented by regularly washing away the mucus and the remains of the previous meal shortly before the one or two heartiest meals in the day. The foods must be simple, the hydrocarbons in excess, and the patient kept in bed, substituting massage for exercise.

In cases where I found no free hydrochloric acid in the stomach contents one or two hours after trial meals, I have seen much benefit from its regular administration in small doses every fifteen or twenty minutes for several hours after eating, and under its use, together with frequent washings, and in some very obstinate cases, I have finally succeeded in much improving the anæmia and nutrition, with re-establishment of the natural secretion. It was seldom, however, that I obtained a real cure of gastric catarrh, and when it occurred the cases were not severe or old ones. The results of treatment were, however, for the time being, satisfactory, as I obtained increase in flesh and strength, and a great amelioration in the gastric symptoms in all cases. What a continuance of such treatment might accomplish, if kept up for long periods, I cannot say. I have never had a patient willing to submit to washings any longer than was needful for material improvement; and they preferred to rest then, to resume upon the return of old symptoms, which was often necessary.

Of the so-called symptomatic (reflex) indigestion in phthisis, I see less and less the more I take pains to thoroughly investigate my cases, in most of which I find the causes of the apparent reflex gastric disturbances to be really due to errors in diet, overexertion, existing anæmia, the state of circulation, abuse of alcohol, more or less severe gastric catarrh, sometimes accompanied by dilatation and ectasia of the pyloric or cardiac orifices.

As due to reflex irritation I have looked upon such cases in which there was hyperacidity and markedly increased motility, and in which any ingested food leaves the stomach in an incredibly short period of time. I have thus seen food taken and passed by the bowels in the course of twenty minutes, and found the stomach empty, but extremely acid after that time. Alkalies are here of no benefit whatever. Opiates give temporary relief by controlling the symptoms sufficiently so that some digestion may take place. In most of my cases the condition improved and subsided gradually, a few times abruptly, but apparently not as the result of treatment.

Digestive disturbances also occur, when considerable areas of the pulmonary circulation are more or less obstructed by reason of inflammatory deposits, fibroid and cicatricial changes, especially in the presence of a weak heart. They are then due to venous stasis and passive hyperæmia in the portal system, and give rise to a variety of symptoms, according to the degree of the inability of the right heart to properly propel its contents and empty itself, and also to the degree of co-existing emaciation. In the earlier stages, when by the wasting an equalization between the total blood quantity and the unobstructed lung surface and heart powers has been arrived at, the symptoms subside again. In more advanced cases absorption becomes seriously impeded, and almost entirely so, by pressure upon the absorbent vessels by the accumulating intestinal gases, which on account of the overfilled portal system are no longer readily absorbed. Aspiration of the gas, through the rectal tube or by puncture, is then our only means to give temporary relief. Gastric and intestinal antiseptics and antifermentatives avail nothing, nor do opiates control the frequent attacks of diarrhœa more than momentarily, and I believe then more by their action upon the heart than by their effect upon the bowel. Rest in the recumbent position, and cardiac stimulants, and the withdrawal of fluids as far as possible, have given me the best results. The diet should be light, dry, and limited in quantity until improvement sets in.

I have seen the above symptoms develop more especially after subsidence of acute processes of extensive character, and the cessation of high fever coincident with occurrence of subnormal temperatures, but also several times abruptly, as the result of physical overexertion upon the heart.

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*WEAK HEART AND ITS TREATMENT.**

By William A. Hammond, M.D., Washington, D.C.

In the present paper I design restricting what I have to say to that form of cardiac debility which is due to weakness of the muscular structure and to defective innervation, leaving out of consideration all those varieties which result from valvular disease, from dilatation, or from obstruction to the circulation due to causes existing in parts of the body remote from the organ. The con-

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dition to which I refer is one which, in my opinion, is exceedingly common, and which, from vicious modes of life, is constantly becoming more frequent. It is one likewise which always leads to disagreeable consequences, and which not infrequently has a fatal termination, and yet the disorder almost invariably admits of complete relief if its treatment is undertaken in time, and the therapeutic measures are such as physiology and pathology dictate.

It is a well-known fact that the voluntary muscles, if excessively exercised, become larger and stronger than if allowed to remain at comparative rest. Although the heart is not a voluntary muscle, it follows the same law as do those that are under the complete control of the will, and, if originally weak, may be rendered strong with almost as much certainty as attends the development of the biceps, for instance, through the use of Indian clubs, dumb-bells, ball-playing, or other means calculated to bring the muscle into powerful action.

There are medicines also through the administration of which increased tone can be given to the voluntary muscles of the body, and there are likewise medicines the chief and most notable effect of which is manifest upon the heart. Before proceeding to the consideration of the influence of exercise I desire to say a few words in regard to these agents so far as their influence over the action of the heart is concerned.

The article best known in this connection is undoubtedly digitalis, and yet it is one in regard to which there is great difference of opinion among eminent authorities. Without going into the consideration of the various theories relative to the therapeutic action of this drug, I shall, nevertheless, give my own views somewhat at length, based as they are upon no inconsiderable amount of experience.

In the first place, I do not believe in what is called the cumulative effect of digitalis as an event likely to occur from even the long administration of the agent. I do not say that such a result never ensues, but I do say that I have never witnessed it. I have repeatedly seen cases in which unpleasant symptoms resulted when digitalis has been given in cases to which it was not adapted, such as in valvular disease, in which the lesion had been fully compensated by an increase in the strength of the heart. In such cases we may have palpitation, intermitting pulse, headache, vertigo, and difficulty of breathing as effects of digitalis. These phenomena occur after a few doses of the drug have been administered. So far from having a cumulative effect, digitalis, like most other medicines, requires to be given in increasing doses if we desire to obtain the fullest possible benefit from its therapeutic influence. It is, I think, the neglect to follow this plan which frequently leads to disappointment. A dose of 2 drachms of the infusion of digitalis, or one of $\frac{1}{30}$ of a grain of digitalin, does very well to begin with, and to continue for a week or ten days, but after that time it should be increased by about one-fourth, and again similarly augmented at the end of another like period. I am quite sure that I have frequently obtained most happy results from this method of administration, results that would have been much less marked if the dose had remained the same throughout the treatment. Patients whose hearts were so weak that they could not walk twenty steps without suffering from palpitation and greatly impeded respiration, and who were anasarcous as high as the knees, in whom there was no kidney-disease and no organic disorder of the heart, at least nothing ordinarily regarded as organic, have been able to walk indefinitely without suffering, to climb a staircase without dyspnœa, and have gotten rid of their swollen legs, after taking digitalis in the way I have described for two or three weeks. So far as the direct effect upon the heart is concerned, its action has been rendered more regular, its pulsations reduced in number and increased in force, as evidenced both by ordinary examination and by the sphygmograph.

Of all the preparations of digitalis, the infusion made from the fresh leaves is to be preferred. Lately, however, I have employed the "Normal Liquid" of Parke, Davis & Co. with excellent results, and, as it can always be obtained, it is well to know that it is a reliable substitute for the infusion. It can be used hypodermically, which is an advantage over the infusion, when prompt action is required.

I have had considerable experience with convallaria and strophanthus. The first named cannot in any respect be compared to digitalis as a heart tonic. It is uncertain in its action and scarcely deserves to be considered as a medicine capable of giving strength to an enfeebled heart. When it was first introduced, several years ago, I was induced to employ it repeatedly in cases such as those to which I now have reference, with the result that I was invariably disappointed. It does not increase the force of the cardiac

pulsations, nor does it lessen their frequency. I have given the tincture in doses of 30 drops with hardly any perceptible effect. In cases accompanied with anasarca it exercises no appreciable influence in diminishing the exudation. Perhaps it is beneficial in cases of cardiac disease coexistent with kidney lesion, but I have very little knowledge of its power in such instances.

Strophanthus is, however, a far more valuable remedy, though even this agent is not comparable to digitalis. There may be patients who are absolutely intolerant of digitalis (although I must confess to never having seen them), and with these strophanthus might be administered with the confident expectation of obtaining good results. Indeed, it is a fairly good heart tonic, giving tone to this organ, and causing the disappearance of anasarca. But I see no reason for substituting it for the more powerful remedy. It appears to me to bear about the same relation to digitalis that brucine does to strychnine, and when administered with a view to its tonic effect upon the heart, it should be given in much larger doses than those ordinarily prescribed.

I have derived very great benefit in the treatment of weak heart from the administration of strychnine in gradually-increasing doses. I usually begin with a prescription consisting of 1 grain of the sulphate of strychnine to 1 ounce of dilute phosphoric acid, and of this I give the first day 10 drops three times, the next day 11 drops three times, and so on, increasing the doses a drop each day until some indication of the physiological action of the drug is obtained. This usually consists of a slight rigidity of the muscles of the neck or calves of the legs. The administration is then stopped for a day or two, and then resumed as before. This process may be continued as long as appears necessary. I am quite sure that I have frequently succeeded in giving tone to weak hearts when even digitalis has failed to produce permanently beneficial results.

Within the last few years I have made great use of cocaine as a heart tonic. So far as I know the first published account of its efficacy in this direction was made by Dr. Beverley Robinson, of New York, but I had employed it, for the purpose of giving tone to the heart, several years before his observations were made known. Its action in this respect is readily perceived by the stethoscope, the sphygmograph, and by feeling the pulse. Moreover, its influence is markedly shown in the ability which it gives the patient to take increased exercise without suffering from dyspnœa or inordinate cardiac action. I usually begin its administration with a dose of $\frac{1}{16}$ of a grain three times a day, and gradually increase this in the course of a month up to 1 grain. It is well, I think, to give it in combination with wine, although this is by no means necessary. I employ for this purpose the so-called restorative wine of coca, which consists of two grains of the hydrochlorate of cocaine to the pint of Malaga wine. A wineglassful contains one-sixth of a grain of cocaine. After this quantity is taken for two or three days, I have the patient add a powder of one-sixth of a grain to each dose, and so on until the total quantity amounts to a grain. In some cases it is not advisable to increase the dose. Cocaine, more than any other medicine with which I am acquainted, appears to possess the property of exhibiting its effects without an augmentation of the dose, and in such instances the original quantity may be continued indefinitely without deleterious effects. On the contrary, usually with marked beneficial results.

Perhaps it will be proper to say a few words in regard to that form of weak heart which is developed suddenly, as the result generally of exhausting disease of long duration. In such cases there is very little time for deliberation, and none for remedies to act that are administered through the stomach. By inhalation and by hypodermic injection alone can we reach the circulation and act on its central organ with sufficient rapidity. Several years ago I saved the life of an army officer by injecting about a teaspoonful of brandy into the cellular tissue of the forearm. The pulse had disappeared from the wrist, and the heart's action could not be detected by auscultation. Respiration came in those long, deep efforts,—thoracic entirely,—at intervals of fifteen or twenty seconds, and it was evident that in a very short time life would be extinct. But in a less period than it takes me to relate the details of the event, the pulse began to flutter at the wrist, the breathing became more rapid, the face resumed something of its natural hue, and the crisis was for that occasion over. Digitalin was now administered, in the dose of $\frac{1}{60}$ of a grain in like manner; the brandy was repeated in about an hour, and the patient, who was recovering from an attack of diphtheria, lived for several years afterwards.

This is not a single experience, and doubt-

less like events have occurred in the practice of many present.

The nitrite of amyl, administered by inhalation, has several times been effectual in giving at least temporary strength to an enfeebled heart; and on two occasions of profound syncope, when it was impossible to administer it through the air-passages, I have given it by hypodermic injection, with entirely satisfactory results. In these latter cases it appeared to act with as great a degree of rapidity as though inhaled. I gave it in the dose of two drops mixed with thirty minims of glycerin, and it was not necessary to repeat the injection.

Nitroglycerin, trinitrin, or glonoin, as it is euphemistically called, is equally efficacious, and may often, in not very pressing cases, be administered by the mouth, in the dose of $\frac{1}{100}$ grain, gradually increased, if necessary. I have, however, in one instance given it hypodermically, with the effect of instantaneously, as it appeared to me, bringing up to strong action a heart that was apparently in its last throes. This was in the case of a lady who consulted me a few days ago for paralysis of the left arm, following diphtheria. While I was examining the muscles with the faradic current, I saw her face become pale, her pupils dilate, her head fall forward, and, on feeling the wrist, I found the pulsation of the radial artery barely perceptible. I had a one per cent. solution of nitroglycerin on the table within reach, and I at once injected a minim of this into the cellular tissue of the forearm. The effect was instantaneous, and that the lady's life was saved I have no doubt.

Only a week or two ago the son of a prominent physician of Brooklyn, who was convalescent from diphtheria, was found dead on the road on which he was walking, and his death was ascertained to be due to heart-failure. It would be well, I think, that the attention of physicians should be specially called to this tendency to cardiac weakness and thrombosis, to which diphtheria renders its subjects liable, and that the proper precautions should be taken in every case against such accidents as those I have mentioned.

To return to the consideration of that form of cardiac weakness which, for want of a better term, I may call "chronic," all medication, no matter how effective it may be, when first undertaken, cannot be relied on to produce permanently beneficial results. It should be accompanied by the use of physical exercise and by diminishing the amount of the liquid ingesta. By the first named of these the heart is strengthened, by the second the amount of blood is lessened, and consequently the heart is put to less strain to accomplish its work. In many cases these measures are of themselves sufficient to so alter the condition of the central organ as to insure a sound state of health, so far as it is affected by the ability of the heart to perform its office in the body. In others, in which there is a greater degree of adipose accumulation than is consistent with sound health, the diet must be of such a character as to retard the deposit of fat.

In what I shall have to say relative to these therapeutic agents, I, of course, make no claim to originality, being fully aware of what Oertel and others have done in this direction. I am simply giving the results of my own observations.

It is well known that walking or any other bodily exercise increases the heart's action, and that in those in whom this organ is weak fatal results have followed upon excessive physical exertion, especially in persons who have passed the meridian of life, or who are overburdened with adipose tissue. Every now and then we read of instances in the daily press of men and women succumbing after having rapidly ascended a long flight of steps or run after a street railway car. It is exceedingly common for persons apparently in good health to suffer greatly from dyspnœa and palpitation of the heart after muscular exercise of a not severe character. These are people who are not in the habit of taking even moderate physical exercise, and whose hearts have in consequence become weak and incapable of properly performing their functions. So long as they are not called upon to make any severe muscular effort, they get along passably well, but in the various exigencies of life the time is almost certain to come when they will be called upon for some physical exertion to which they are not accustomed. Then it is that the heart suffers to such an extent as not infrequently to cause death.

The heart is like any other muscle. It is intended to accomplish a certain amount of work, and, if it is deprived of this work, it undergoes degeneration. If a person should resolve not to raise the arm for six months, it would be found that the power to raise it would be greatly diminished; and should he persist in not raising it for a few years, he would find it impossible to do so, from the fact that the muscles had undergone degeneration and atrophy. A like process undoubtedly

takes place in the heart when it is deprived of its due amount of exercise. Few persons in my experience are in the habit of giving the organ the amount of work which it ought to have. We have all of us had many patients who could not walk across a room without having the pulsations of the heart nearly doubled in frequency.

As Oertel has pointed out, no means for exercising the body so as to strengthen the heart is comparable to ascending heights. The person subjected to this kind of exercise lifts the body from the ground, and thus does an amount of work equivalent to that of raising a corresponding weight of iron, for instance, with each step that he takes. Besides this, he brings many more muscles into action.

Of course this is a form of exercise that should be used with great discretion in cases of feeble heart, for otherwise we might get such deplorable results as we almost daily see follow upon severe muscular efforts made by those unaccustomed to them. It will not do to tell a man or woman 50 years of age that he must climb a steep hill or ascend briskly several flights of steps. The process must be a gradual one, and should always be undertaken, at least in its beginning, under the supervision of a physician. I have ascertained that we have in the heart itself a very accurate measurer of the extent to which the physical exercise recommended should be practised at any one time. If by the effort the pulsations of the heart are increased more than fifteen beats in a minute, it should not be carried any farther at that time, and it may be persevered with, within, of course, reasonable limits, so long as the pulsations are not increased above that number. For instance, if I find in a patient with a pulse of 80 in a minute that ascending one flight of steps increases the number to 95, I have him stop, sit down, and rest for a few minutes, or until the pulsations have fallen to about the normal number. I then have him resume the exercise, and again count the pulsations. It will generally be found that this time they are not increased 15 beats. If, however, they should show this or a greater increase, I keep on repeating the process, even if it should take an hour or more, till the number of additional beats is considerably less than 15. In cases such as those to which I have reference, it will, according to my experience, invariably be found that one such *séance*—if I may use a word not strictly accurate in the present relation—has produced a decided advance, and that the heart has gained a degree of tone that it will never lose if the system be continued. Of course, to stop after one or a few such experiments could lead to no permanently good results. But the comfort which the patient experiences from this treatment is such that there is no danger of its being interrupted. I have mentioned the staircase as a ready means of enforcing this particular kind of physical exercise, but it will readily be understood that there is nothing special about such an arrangement beyond its general adaptability and the facility with which it can always be obtained. If the patient lives in the country, where hills exist, they will on some accounts be preferable, for they admit of the exercise being taken in the open air, which is often a matter of considerable moment.

In the Sanitarium, which I am conducting in Washington City, a feature in which I take great interest, is what I may call the treadmill, for it is made upon the same principle as that which prevails with the apparatus for punishment or labor with that name. It is so arranged that it can be moved by persons of different weights who may stand on it, and I think it affords very admirable means of applying the principle involved in climbing heights to the treatment of weak hearts. It admits of accurate adjustment to the amount of work which the patient is deemed capable of performing.

It has been contended by some authorities that exercise of the muscles of the upper extremities is more efficacious in giving tone to the heart than when the lower extremities alone are brought into action. I think that there is some truth in this opinion. At any rate it is better that the arms and chest should be exercised in conjuction with the special movements of the lower limbs than that they should be allowed to be passive. Wrestling at arm's length is a very admirable means of exercising the muscles of the upper part of the body. Dumb-bells, Indian clubs, and the lifting of moderately heavy weights are also efficacious measures. It must not, however, be forgotten that in wrestling the desire to be pre-eminent is likely to be a prominent feature, and that this feeling may tempt the contestants to go further than is safe. No such contests should ever be permitted to take place between patients, but should be conducted under the immediate observation of the physician or well-instructed attendant.

Of course in all these cases the general

health must be attended to, and it is well that some one or more of the heart tonics I have mentioned, as well as the measures next to be referred to, should be employed. We would think very poorly of the general who, undertaking to capture a fortification, and having several guns that he could bring to bear on the enemy's works, should persist in firing only one.

Reducing the quantity of liquid habitually imbibed is scarcely of secondary importance to systematic exercise. And as it is generally the case that persons suffering from weak heart are particularly addicted to the excessive drinking of water and other fluids, it is imperatively necessary that the point receive due attention from the physician. Very little, if any, of the liquid taken into the system passes directly out through the intestinal canal. It is first absorbed into the blood by osmosis, where, for the time at least, it adds to the volume of the circulating fluid, and must pass through the heart, to be excreted by the lungs, skin, and the kidneys. Thus the work of the heart is rendered more severe than it should be. It is overtaxed, and suffers in consequence. The effect is very different from that caused by proper physical exercise, for this latter only increases the action of the heart within its normal limits. The matter may, perhaps, be more clearly explained by the consideration of the fact that it would be easier for a man to lift twenty pounds weight five times, in even rapid succession, than it would be for him to lift a hundred pounds once. The former would cause nothing like so much strain to the muscular tissue as would the latter. Now a medium amount of blood corresponds in the necessary action of the heart to move it to moderate exercise frequently repeated, while an excessive amount of blood produces analogous effects to those resulting from an undue muscular effort.

We have in the disease, one of the names of which is exophthalmic goitre, a condition of the heart similar in some respects to the affection now under consideration. Its action is exceedingly frequent, its pulsation feeble, and the most moderate physical exertion, as well as very slgiht mental disturbance, are sufficient to increase the degree of deviation from the normal standard. In two cases of this disease, one of which, I think, came also under the observation of Dr. Satterthwaite, of New York, I reduced the total amount of fluid ingested in twenty-four hours to sixteen ounces. This included everything in the way of liquids—water, milk, coffee, tea, etc.—taken into the system, with the effect of materially increasing the force of the heart's pulsations and lessening their frequency. In both cases the number fell from over 160 per minute to less than 100, and in one of them to less than 90, and this within forty-eight hours after initiating the measure. The ultimate results were that one of these patients was greatly relieved, perhaps cured, —for I have not heard from her for over a year,—while the other entirely recovered in about four months under no other treatment than this, with digitalis and the hydrobromate of hyoscine. This last-named remedy was only used for about a month. Its effects were very decided, but were much more markedly exhibited when the reduction in the quantity of the fluid ingesta was well under way.

Relative to diet and such means as are proper, in addition to those mentioned for lessening the amount of fat deposited, I would strenuously insist upon the eating of as small an amount of the carbohydrates and hydrocarbon as is consistent with good health. Potatoes, rice, and other farinaceous vegetables should be absolutely prohibited. Bread, especially that made from the finer grades of wheat flour, should be almost as rigidly enjoined. I never allow more than two ounces of such bread daily, and this in the form of toast. I require the patient to weigh it accurately on a little letter-balance, which is admirably adapted for the purpose. Buckwheat I find still more admissible, and of this as much as three or four ounces, in the form of griddle-cakes, may be taken daily. Buckwheat, as is probably known to most of those present, may be ingested in considerable quantity without increasing the amount of sugar in the urine of diabetics.

I allow the green vegetables, such as cabbage, cauliflower, Brussels-sprouts, celery, spinach, asparagus, lettuce, etc., *ad libitum*. Tomatoes, egg-plant, apples, cucumbers, and a few other non-saccharine or non-amylaceous vegetables, or which, at least, contain sugar and starch in small proportion, may also be permitted in reasonable amounts.

As to fats and oils, the less taken of them the better. A little butter may be allowed, say half an ounce daily, but beyond this it is not advisable to go with the hydrocarbons. Animal food is best in the form of fish, oysters, crabs, lobsters, eggs, lean beef, mutton, fowls, and game in moderation. It is now well known that highly nitrogenous food,

when taken in excess, is broken up into fat, and is deposited as such in the tissues of the body, especially if at the same time the habit of the individual is sedentary.

Doubtless many cases of cardiac weakness are the direct result of either fatty degeneration of the muscular substance of the heart, or of an excessive deposit of adipose tissue interstitially or on the periphery of the organ. In the one case, the muscular tissue loses part of its normal power; in the other, its action is impeded. I am quite sure that by the method of treatment described the fat begins to disappear from the heart before a like process is initiated in any other part of the body. This is seen from the greater comfort while taking exercise, due directly to the lessening of the dyspnœa, the effect being generally perceived after two or three days have elapsed.

Of course, as the body loses weight, the improvement becomes still more marked, until, in a short time, varying from a week to a month, the patient can run and climb heights and indulge in other violent exertion, which would have been absolutely impossible, without danger to life, during his former condition.

NEW METHODS OF TREATING ERYSIPELAS.

Rosenbach's method consists in washing not only the erysipelatous patch but the entire neighboring surface with soap, and then bathing daily these patches with five per cent. solution of phenic acid dissolved in absolute alcohol. Very brilliant results are claimed to follow this method, both as regards the course of the disease and the febrile phenomena. Even absolute alcohol is said to produce a favorable action.

In Nolte's method the entire affected surface and surrounding zone is painted twice daily with a mucilage of gum-arabic, containing from three to five per cent. of phenic acid. Good results are claimed to follow, as is also the case when the phenic acid is mixed with vaseline.

The method of Koch consists in applying, by means of a camel's-hair pencil, the following ointment in a perfectly thin layer over the affected parts:

Creoline, 1 part;
Iodoform, 4 parts;
Lanolin, 10 parts.

After the ointment is applied, it is then covered with a thin layer of gutta-percha. This method is said to be especially applicable to erysipelas of the face and of the hairy scalp.

In the method of treatment of Nussbaum and Brunn, ichthyol is employed in collodion.

Hallopeau recommends the use of a solution of 1 part to 20 of salicylate of sodium. Thick cloths are wet with this solution, then applied to the affected parts, and then covered with a layer of rubber-cloth, so as to prevent evaporation. Almost immediate relief is obtained, and a cure is said to follow on the third to the fifth day.

Hunter recommends the injection of carbolic acid into the healthy skin at a distance from the part infected. This method of treatment is extremely painful, and is only applicable in cases of grave nature of the face or hairy scalp.

Dr. Kraske advises making an incision in the healthy skin around the erysipelatous patch before applying the antiseptic substance.

Wolfler makes use of mechanical compression by bandages applied so as to circumscribe the inflamed tissue, while Dr. Kraske proposes elastic rubber bands to accomplish the same effect where these are applicable.—*La Practique Médicale*, No. 33, 1890.

THE TOXIC PRINCIPLE OF PYRETHRUM FLOWERS.

Messrs. Schlagdenhauffen and Reeb have been for some time occupied in a pharmacological and chemical investigation of pyrethrum flowers from different sources, and as a result of their investigations they announce (*American Journal of Pharmacy*, September, 1890) that the active principle of pyrethrum flowers is an acid soluble in alcohol, amylic alcohol, ether, and chloroform, which may be isolated by means of ether, after having been converted into an alkaline salt, and decomposed by tartaric acid in aqueous solution.

When pyrethrotoxic acid was hypodermically injected into animals, it was observed that the poison produced its effects in two distinct stages. In the first there was an excitement more or less pronounced, proportional to the quantity administered; in the second there was a complete prostration, accompanied always by paralysis of the lower extremities, which might disappear after a time, or be the precursor of a fatal issue, the respiration and circulation being affected only in the latter case.

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Leading Articles.

INSOMNIA AND HYPNOTICS.

IT is generally agreed at the present day that during sleep the brain is relatively anæmic. The observations of Durham, of Hammond, of Mosso, and others have proved this. During sleep all the encephalic blood-vessels are under a diminished pressure, as shown by the manometer, and this lessening of the active flow corresponds with a diminution of cerebral function. This is in accordance with the facts of physiology generally; the performance of function is characterized by vascular activity and fulness, the cessation of function is attended with decrease of the vascularity and volume of the part.

The immediate cause of sleep, however, is not simply the shutting off of a portion of the blood-current from the brain. The lessening of the blood-supply to the encephalon is rather the accompaniment than the cause of sleep. The *vera causa* is the torpor—*engourdissement*, as the French physiologists term it—of the cerebral cells. This *engourdissement* is the result of waste, unbalanced by repairing the hemispherical ganglia which become functionally inactive owing to diminution of oxidating material as well as to clogging of the venous and lymphatic channels by the accumulated *débris* of organic combustions.

But this is not all. As the effete products of cell-function have a paralyzing action on the cells themselves,—a truth exemplified even in the protoplasmic life of microbes, which are now known to generate, by their activity, ptomaïnes that are microbe poisons,—so the toxic theory of sleep, first propounded by Preyer, has much probability in its favor. Preyer thinks that lactic acid is one of the principal waste products whose relation in the blood causes sleep, and refers to experiments of his own, where lactic acid was injected into the veins of animals, and produced a deep somnolent condition, which could not be distinguished from natural sleep. But lactic acid is only one of the toxic products of the living economy; the urinary salts are mostly destructive of cell life, and every cell is a laboratory of poisons,—leucomaïnes,—which exercise their injurious effects on the organism as soon as the emunctories are incompetent to perform thoroughly their task of elimination. It is in the urine that we find the greater part of these excrementitious products. Bouchard, who has made many interesting experiments on animals by injecting the urine of various physiological and pathological states, finds that the urine of the day possesses a toxicity twice as great as that of the night, and that the former produces narcosis, while the latter possesses convulsivant properties.*

From these experiments the inference is drawn that during the period of waking activity the processes of disassimilation give rise to products which, by their accumulation, produce sleep, and this accumulation takes place because the elimination of these substances by the urine goes on the more slowly the nearer we approach the usual period of sleep. On the other hand, during sleep the convulsivant substances which result from denutrition co-operate in bringing about awakening.†

Insomnia is produced by causes which augment the excitability and functional activity of the cerebrum. As the exercise of the emotions and intellect produces a wakeful state, and the continuous application of the attention to any subject is inimical to the repose of the brain, so causes of a psychical

* *La Médecine Moderne*, 1890, p. 183.
† Ibid., *loc. cit.*

order play a principal part in the etiology of insomnia. Anything which keeps consciousness aroused provokes wakefulness; hence pain, from whatever cause, is antagonistic to sleep. Functional derangements of the viscera, sufficient to engage the attention, are promotive of insomnia; thus we have the insomnia of cardiac, pulmonary, and gastric affections. But it is not even necessary that the victim of wakefulness from these causes should be conscious of the sensation of pain or distress, and there are digestive disturbances which produce no pain, and which none the less prevent sleep. It is probable that these causes act reflexly by determining an amount of cerebral congestion incompatible with sleep. Genital excitations also may keep up a state of arterial plethora in the cerebrum inhibitory of sleep; febrile conditions, whether by the influence of toxic principles attending them or of the circulatory disturbances which they entail, have the same result; and the free use of certain antihypnotic agents—as tea, coffee, alcohol, and tobacco—may for a time banish "tired nature's sweet restorer."

Doubtless insomnia is one of the crying evils of the present day. The conditions of our modern life entail on students, men of business, professional and literary men, anxiety, worry, and fierce competition; the brain is unnaturally forced and the delicate machinery of its circulation is early deranged; loss of tone of the cerebral blood-vessels results in malnutrition of that organ, and if not in absolute, at least in partial insomnia; the little, dreamy, broken sleep that is obtained being insufficient to give a proper fitness for the active duties of life. The poor sleepers of the day are legion. Such persons are constantly tired; after an hour or two of application to any subject there is a feeling of exhaustion, which often prompts the sufferer to resort to some stimulant,—coffee, wine, tobacco; in some instances the help of morphine is sought,—when he feels in better trim, and succeeds in completing the task before him. Some of these victims of insomnia go to sleep readily, but the sleep is dreamy and unrefreshing; the night seems interminably long. Others fall asleep soon after going to bed, but they wake up after two or three hours of sleep, and then fail to go to sleep again; the consequence is that they are exhausted the next day. Others, still, have their sleeping periods sandwiched in between periods of wakefulness, during which thoughts and imagination run riot. The physician who is consulted by patients of this kind will be careful how he prescribes soporifics. The relief obtained by an hypnotic dose of sulphonal, chloral, or opium is so speedy and so magical that the temptation is great to resort to these drugs, but (to say nothing of the possible baneful effects of these medicaments on the cerebral cells) this kind of treatment can only be called symptomatic, and does not remove the cause which is still operative for mischief. As sleep may be hypothetically regarded as brought about by certain toxic products of exercise, and as muscular exercise is known to be more productive of these hypnogenous substances than intellectual, so the medical adviser may very properly urge his patient to perform some severe muscular work before going to bed,—a long walk in the open air, dumb-bell exercise, etc. Many a victim of insomnia has found a remedy for his infirmity in garden-work, joinery, wood-sawing, or even in such active sports as base-ball and lawn-tennis. Sleep is much more certain to follow muscle-tire than brain-tire.

As the leading indication is to induce that cerebral torpor which is the necessary antecedent of sleep, it is well to advise the insomnic patient to avoid all cerebral excitants in the evening. He should not indulge in tea, coffee, tobacco, or spirits; he should refrain from reading, writing, and other mental labor. Even novel-reading (recommended by some as a diversion) is of questionable utility; listening to the reading of a dull book is a much more rational expedient. If one can succeed in breaking the train of thought by fixing the attention on any series of monotonous sounds (the singing of crickets, the roar of a distant waterfall, the whistling of the wind down the chimney, etc.), he will often, before he is aware of it, be caught in the toils of Somnus.

The sleep state being one in which the cerebral arterioles are contracted, with lessened circulation in the encephalon, the artificial production of this condition would seem to be favorable to sleep, and much account has been made of cold applications to the head, made with the intent to exsanguinate the brain, hot foot-baths to determine blood from the head, and the general warm bath as a powerful means of derivation. Hammond states that he has seen the application of the cold douche to the heads of refractory prisoners bring on a deep sleep. We believe, however, that cold to the head, as a means of provoking sleep, oftener fails

than succeeds, and we have even known it to aggravate the insomnia. Of more efficacy is bathing the trunk and limbs with cold water, followed by a brisk rubbing to induce a reactionary glow; standing naked on the cold floor a few minutes, then a hasty rub down, often does good in the same way by derivation. Of still greater benefit is the warm bath or wet pack, as has been proved in innumerable instances in children and in insane persons.

Where the insomnia depends on peripheral or visceral irritation, the remedy is sufficiently plain. The pain of an abscess, of a carbuncle, of a dermatosis, will, perhaps, require an opiate; digestive insomnias are often especially troublesome. While some persons sleep best after a full meal, others cannot sleep well while the primary digestive process is going on, especially if the digestion be laborious and difficult. Here the remedy would be a light supper, with milk for the drink instead of tea or coffee. Germain Sée speaks highly of drachm doses of bichlorate of soda in a tumbler of hot water at the hour of retiring; in the terminology of that writer, there is nothing but *hyperchlorhydria* that causes this sleepless agitation. Other cases of insomnia are, as Hammond points out, of the asthenic and passive variety, and require not only nutritious food, but stimulants. A glass of hot milk at bedtime, with a tablespoonful of whiskey, will often speedily induce sleep; a cup of beef-tea is sometimes worth more than any hypnotic.

In the insomnia due to dyspnœa, the cardiac or other cause claims the first attention. For cardiac asthma, iodide of potassium, iodide of ethyl, inhalations of pyridine often do good, though in obstinate cases the resort will finally be to hypodermic morphine.

Among the prevalent insomnias, those of toxic origin deserve a special treatment. How many of the cases that come under the notice of the physician depend on lithæmia and uræmia! Here an eliminative treatment by saline cathartics, diuretics, and even sudorifics is demanded. In lithæmic cases, moderate physical exercise, by favoring the complete transformation of waste products and promoting circulation and excretion, will always benefit. Much of that restless irritability, which persons of sedentary habits often experience, as well as that oppressive drowsiness of which they sometimes complain, will be better dissipated by active exercise in the open air than by any pharmaceutical remedy.

This brings us to the subject of the hypnotics, properly so called, which sometimes become necessary as adjuvants to the hygienic treatment. On the hypothesis that normal sleep is brought about by a sort of intoxication of the cerebral cells (Preyer's theory), there are certain drugs which also produce their result by so modifying these cells that their function is for the time suspended. Foremost among the pure hypnotics which produce sleep without causing any narcosis, we have chloral, sulphonal, paraldehyde, and urethan. The consideration of these, along with other sleep-producers, their indications and contraindications, must be reserved for another number.

TREATMENT OF GONORRHŒAL RHEUMATISM.

THE treatment of blennorrhagic arthritis (otherwise called gonorrhœal rheumatism) has always been vexatious and perplexing. The older authorities, regarding it as a variety of common rheumatism, taught that it should be treated in the same general principles as this latter; the bowels to be cleared by calomel, Dover's powder to be given to relieve pain, hot anodyne fomentations to be used, and alkalies, subsequently iodide of potassium and bark, compound tincture of guaiac, etc., to be administered. Under this treatment the case was often exceedingly protracted, and patients were apt to recover with stiff joints.

When salicylic acid and the salicylates were introduced into the therapeutics of rheumatism, it became customary to treat gonorrhœal arthritis with these remedies. The result was never very favorable. Remedies which acted beneficially in ordinary rheumatism were found to be inefficacious in blennorrhagic swellings of the joints.

There was an advance in the treatment of this affection when it was taught that gonorrhœal arthritis is a form of pyæmia, generally mild (it is true), but sometimes appearing in a severe and intractable form. Barlow, in 1860, was the first to enunciate this view in the first edition of his classic treatise on "Diseases of the Joints." He reports several cases which were attended with suppuration of the knee-joint (the site of predilection of this form of arthritis), and subsequent disorganization of the joint. According to Barlow, "A certain sluggish form of *contagium vivum*, dumb-bell microzymes, or a condition

of fluids and tissues incapable of cultivating the more active forms, modify the disease down to a slight, comparatively harmless process."

Barlow further insists on the fact, now generally recognized by pathologists, that the joint-complications of gonorrhœa are not produced by rapid suppression of the urethral discharge, for it is in long-standing cases that such trouble arises. The disease, being a manifestation of blood-poisoning, should be treated energetically by quinine, which he regards as the best antiseptic for the purpose. He would prescribe, in ordinary cases, 10 grains every four or six hours, and, where there is much effusion with distention of the joint, he would aspirate or antiseptically puncture the joint with piston-trocar and hydraulic tube.

Barlow's view of the pathogeny of gonorrhœal rheumatism has been strikingly confirmed by subsequent investigators. According to Gerster, this form of arthritis is due rather to the absorption and presence of simple pyogenic organisms than of gonococci. He regards it as certain "that pus-generating organisms play an important part in cases of gonorrhœic and non-gonorrhœic urethritis, and that the metastatic processes complicating urethral inflammations are mostly chargeable to their presence and not to the presence of gonococci."

Gonorrhœal arthritis, then, being a form of septicæmia, should evidently be treated as such. The best success seems to have attended the free use internally of quinine, with or without tincture of chloride of iron, such anodynes as might be needed for the relief of pain (and here we may mention that Refat, in a late number of the *Bulletin Général de Thérapeutique*, speaks highly of phenacetin in 10 grain doses every three hours till a drachm has been taken, this medication to be continued several days), and, lastly, the proper local treatment by splints and aspiration.

Foyrer, of Calcutta, was one of the first to advocate paracentesis of the joint in both chronic and subacute forms, care being taken to exclude the air by carefully closing the puncture and fixing the joint on a splint.

Bryant (*vide* "Surgery") endorses this mode of treatment, affirming that it had given him great satisfaction in one or two severe cases, but adds, that "it is a practice that ought to be followed with extreme caution." Since the introduction of the Dieulafoy and other aspirators, with their fine needles and exhaust-bottles, operations for removal of fluids from joints and other closed cavities are performed with great comparative safety, and synovitis of the knee-joint, attended with copious effusion from whatever cause, is very generally treated by aspiration by the surgeon of to-day. Dr. Henry O. Marcy has published a pamphlet "On Aspiration of the Knee-Joint," in which he gives the details of fourteen cases which he had aspirated; all did well, and in all there appeared to be marked shortening of the duration of the affection. In most of these cases—tabulated as gonorrhœal rheumatism—the fluid withdrawn was serous, sometimes sero-sanguinated, not purulent. It was generally necessary to reaspirate after a couple of days; sometimes numerous aspirations were made, but generally not more than two or three were required. The relief obtained by drawing off the fluid was in all instances instantaneous. The temperature fell, the pulse lowered, and sleep followed. The knee-joint was generally bandaged and fixed to a plaster splint after the aspiration. With few exceptions the No. 1, or smallest-sized needle, was used.

Other surgeons in aspirating the knee-joint for this affection have found it necessary to use one of the larger-sized needles; the smaller needles are almost certain to be stopped up by blood clots during the operation.

Aspiration seems to do good in this disease, not merely by relieving local tension and pain, but by promoting absorption. This is the almost uniform testimony of those who have resorted to this mode of treatment of gonorrhœal arthritis.

Dieulafoy, in 1878, reported that he had aspirated the knee-joint two hundred times. He believed the operation to be a safe and efficient one in a large class of cases. He uses the No. 2 needle, first placing a rubber bandage around the knee, leaving uncovered the place of puncture. This point of election is the external cul-de-sac of the joint, on a level with the upper border of the patella, and about ten centimetres outside of this bone. Compression is used as soon as the fluid is evacuated by a flannel bandage applied from the foot up to the thigh. This is removed in twenty-four hours, and, if fluid has collected, it is reaspirated.

Since the presentation of Marcy's paper, he states that he has aspirated the knee-joint eighteen times, and twice injected and

washed out the synovical cavity with carbolic acid. The results of all these cases were good, no anchylosis or stiffness following.

Recently Schüller, *privat-docent* of surgery of the faculty of medicine of Berlin, has published his mode of treating blennorrhagic arthritis. The general treatment consists in the administration of iodide of potassium in frequently-repeated doses,—5 to 7 grains every two hours for two or three days. The iodide, he says, is especially beneficial in all forms of this disease, whether acute, subacute, or chronic, but particularly in the acute forms. For local treatment, he employs in acute cases compresses wet in a cold phenic acid solution, 1 to 100, and in chronic cases mercurial ointment, with immobilization of the limb. Where there is an abundant effusion in the joint, he would aspirate. Aspiration promptly aids the effects of the iodide of potassium.*

THE ACTION OF THE IODIDES AND IODINE ON THE BLOOD-PRESSURE.

IN spite of the valuable results which daily follow the employment of the iodides, the mechanism of the action of these bodies is still in many respects clouded in obscurity, particularly as regards their influence on the circulation and the blood-pressure, effects obtained by experimental investigation at the hands of numerous observers not having led to concordant conclusions.

Thus Rose, who was one of the first to study this subject, claimed that the iodides produce vascular spasm, while the majority of later experimenters have maintained that their administration led to the dilatation of the small vessels.

Bogolepoff, from experiments made on frogs after division of the pneumogastric nerve, stated that with the arrest of respiratory movement there was stagnation of the blood in the capillaries, and, finally, the arrest of the heart in diastole; and he concluded that the iodides produced rapid dilatation of the peripheral blood-vessels, with a consequent fall in blood-pressure and the strength of the pulse, even when the doses administered were not poisonous.

Sokolowski, in experiments made on dogs, found that in some instances the pulse was accelerated at the same time the pressure was reduced, while in other cases the pulse was slowed without any modification of pressure; but with large doses of the iodide of potassium the heart is rapidly paralyzed without any influence on the pneumogastric nerves, and the peripheral blood-vessels are dilated.

Boehm, on the other hand, claims that the iodide of sodium has not the slightest influence on the circulatory or on the arterial pressure. In this, as in the majority of experiments, results have been greatly obscured by the employment of salts, either constituent of which is capable of modifying the result. Thus, if the studies are made with the potassium salts, a different result will be obtained from what will follow the employment of sodium salts, since minute doses of potassium stimulate cardiac energy, and nearly always increase pressure, while slowing the pulse; but in larger amounts,—that is, $\frac{1}{20}$ grain for every two pounds of body-weight, as determined by Aubert and Dehn,—there is then a fall of pressure, followed by a secondary increase. But if the proportion of potassium exceeds this ratio there is permanent reduction of blood-pressure, and death results from cardiac paralysis.

Huchard and Eloy, on the other hand, attribute the results of these experiments and those made with the iodide of sodium solely to the iodine, not recognizing the value of the results attained by Ringer and Murrell as to the influence of sodium and potassium bases on the economy, claiming that from the difference of the results obtained from the subcutaneous injection of iodide of sodium and the carbonate, the reduction of blood-pressure which followed the employment of the former shows that it is the iodine which is the efficient factor in these combinations.

Sée and Lapicque, as recently mentioned in the GAZETTE, have arrived at conclusions which resemble those of Aubert and Dehn, for they admit that the administration of the iodide of potassium first produces an increase of blood-pressure due to the action of the potassium on the heart, the pneumogastric remaining irritable and the peripheral blood-vessels in a state of constriction. This first phase they attribute to the action of the potassium, and claim that it is followed about an hour later by a phase of depression or vaso-dilatation, which is due to the iodine, and which may last for several hours. If the iodide of sodium is employed, the first phase is wanting.

* *Semaine Médicale*, September 10, 1890.

The value of an accurate determination as to the exact mode of action of the iodides, and especially of the potassium salts, need scarcely be mentioned, for their value in all diseases, characterized by permanent arterial tension, and particularly in arterio-sclerosis, is now generally recognized.

In the *Revue Médicale de la Suisse Romande* for August 20, 1890, Messrs. Prévost and Binet publish an experimental contribution on this subject. They have made a number of experiments on rabbits, cats, and dogs, employing iodated water, solutions of the iodo-iodates, and of the iodides of potassium and sodium. While iodine is scarcely soluble in water,—only 1 part to about 7000 at the ordinary temperature,—its solubility is greatly increased by the addition of minute quantities of an alkaline iodide, and they have found that injections of such iodated water, or the solutions of iodo-iodates, do not sensibly modify blood-pressure when injected slowly into the veins, while when administered by the stomach they were occasionally noted to have produced a slight increase in blood-pressure. If the solutions are rapidly injected, rapid fall of blood-pressure and death follow. If, however, the disturbance be not sufficiently great to produce instant death, normal blood-pressure is soon restored. The iodide of potassium injected into the veins, they found, as is the case with the potassic solution, in minute doses produces momentary increase of pressure, and in larger doses a depression, which may become fatal. The pressure may after the injection regain its original height, but about three-quarters of an hour later a progressive fall of blood-pressure habitually follows. Administration by the stomach produces no notable modification of blood-pressure. The iodide of sodium introduced into the veins is much less dangerous than the potassium salt, but produces an analogous result when given in excessive doses.

The authors' results seem to show, especially when it is noted that administration by the stomach in no case produces any modification of blood-pressure, that it is not warrantable to attribute to iodine or the iodides any action on the blood-pressure when they are administered in small non-toxic doses by the stomach; and yet the effects of the iodine treatment in arterio-sclerosis and certain cardiac affections is incontestable. So one must then imagine that the blood-pressure pathologically disturbed may be more sensitive to the influence of the iodides than the healthy organism.

Reports on Therapeutic Progress.

ON THE PRESENT STATE OF BACTERIOLOGY—THERAPEUTIC RESULTS.

At the Tenth International Congress of Medical Sciences, held in Berlin, August 4–8, Dr. R. Koch, of Berlin, made one of the opening addresses on the present state of bacteriology, of which the following is an abstract:

Fifteen years ago bacteriologists knew of the presence of micro-organisms in charbon, typhus recurrens, and the infectious diseases of wounds, but did not yet impute an etiological importance to them. Since then new methods of research have given to microbiology a rapid development, for which progress we are chiefly indebted to improvements in microscopy and to the employment of aniline-staining reagents, after which it became possible to differentiate the germs by means of cultures in various solid and liquid nutrient media.

By pursuing their investigations, bacteriologists have succeeded in identifying new micro-organisms, and in establishing with certainty their etiological relation to the diseases in connection with which these microbes have been met. It was hoped, after this first success, that they would rapidly accomplish the isolation and identification of the micro-organisms of all the infectious diseases. In this they have been disappointed.

To-day we may consider it as settled that the infecting bacteria are organized living beings, forming fixed and constant species, quite as independent as the vegetal organisms of higher order. They have certain acquired morphological qualities, and are not derivable from fungi, from moulds, or from the lower algæ. Moreover, we can deduce from the existence of infectious diseases of great antiquity, such as lepra, phthisis, the proof that bacilli preserve for ages their characteristic properties. Without doubt, varieties may arise, as in all species, but the former do not lose the principal characters of the species.

In a bad nutrient soil imperfect forms of micro-organisms may be developed, forms which have lost the properties of the perfect microbes which thrive in living bodies and form toxic substances. But these varieties remain within limits which are very restricted, and never constitute a transition from one species to another; thus, for instance, the

bacillus anthracis never becomes the bacillus subtilis.

To determine the species of a bacillus, it will not do to content one's self with isolated, fixed, or variable characters, but it is necessary to note the greatest sum possible of morphological and biological characters which it can present, otherwise there is nothing but misconception and confusion in bacteriology. The presence of the bacilli of typhoid fever in the mesenteric glands, the liver, the spleen cannot give rise to any mistake, because there are never found in those organs similar bacilli. But we can easily be mistaken in endeavoring to identify the typhoid bacillus in the intestinal liquids, the water, or the air, for these media contain a great number of microorganisms which much resemble it. The same mistake may be made with reference to the bacillus of diphtheria; so that it will not do to affirm the presence of a specific microbe in the water, the soil, in sewer-pipes, etc., without subjecting these results to a rigorous criticism.

Per contra, it has been possible to establish, from the very first, for the bacilli of tuberculosis and of cholera, characters which enable microbiologists to determine their species with absolute certainty. This result, this rigorous precision of diagnosis, is what we must require in the examination of the bacilli of diphtheria and of typhoid fever; it is easy to understand the prophylactic value which a sure differentiation of these infectious agents would give.

Koch next asserts that his researches on the characters and habitats of the bacillus tuberculosis have taught him the bounds which prudence has set, and the necessity of extreme caution in these investigations. One can acquire certainty only after the study of the reactions under aniline-staining fluids, and after long watching pure cultures and testing pathogenic qualities. He affirms that he has been able thus to prove that the bacillus of the tuberculosis of fowls differs in many points from that of other animals; this he has shown both by cultivating it and by the results of inoculation. To know whether he had to do here with a special microbe or a variety of the true bacillus of tuberculosis, he endeavored to produce artificial varieties of the tubercle bacillus by all sorts of procedures. He exposed cultures for many months to high temperatures, amounting almost to the destruction of these bacilli. He subjected them to the action of light, of moisture, of chemical substances, cultivating them in competition with other bacilli, passing them many times through the bodies of animals more or less refractory to tuberculosis.

It was only the past year that, having received a certain number of fowls affected with tuberculosis, he was able to obtain several pure cultures from this direct source; the results were identical with those which have been mentioned above.

The bacilli of the tuberculosis of fowls constitute, then, a different species (though very near of kin) from those of common tuberculosis. The recent investigations of Mafucci have confirmed this conclusion. We cannot say that this new bacillus is pathogenic for man before having noted its presence in the human organism.

Recent researches have also shed light on the question of the relations between bacteria and the infectious diseases. When we have established that certain bacteria are found constantly in this or that infectious disease, that they are never met in any other, that they can live and be cultivated out of the animal body, and that in this state they are capable of reproducing the disease, their etiological *rôle* is proved. This demonstration has been made for tuberculosis, erysipelas, tetanus, and many of the diseases of the lower animals.

Per contra, the fact that we cannot reproduce with pure cultures a disease in animals is evidently not sufficient to prove that the particular bacillus is not the cause of the disease in man. This is the case with the bacilli of lepra, of Asiatic cholera, of typhoid fever, of diphtheria, and of typhus recurrens.

The study of the following questions has also made great progress: the parasitism of bacteria, their mode of penetration and of evolution in the organism, the chemical products (tox-albumens) resulting from their activity, the combinations of several infectious diseases in the same individual, immunity, etc. The theory of phagocytosis, on the other hand, is every day losing ground.

The study of the action of light and of heat on bacteria has given us important results for prophylaxis.

Solar light has a destructive action on the bacilli of tuberculosis; according to the thickness of the stratum of the culture exposed to direct sunlight, the bacilli are killed in a time varying from a few minutes to a few hours. Diffused (indirect) light has a like action, but more slow; cultures exposed to the daylight by a window are killed in five to seven days.

All bacteria have need of moisture in order to develop, but they cannot, *per contra*, quit the medium in which they are growing, and are not susceptible of diffusion through the air, except under the form of dust, the product of desiccation.

Bacteriological researches have resulted in much that has been delusive, but also in much that has been encouraging.

The fact that we have not yet been able, despite indefatigable researches and painstaking, to discover the micro-organisms of the exanthematous diseases, proves that we shall be compelled to seek for the pathogenic agents by methods of another order. Perhaps we have to do in these diseases with microbes belonging not to the group of bacteria, but to that of protozoa, like those which have been found in the blood of patients affected with malaria.

As for the practical results connected with bacteriological studies, they are already considerable.

Disinfection is performed in a more judicious and effective manner. Potable waters are being examined from the point of view of their infectiousness ; the same may be said of milk and other aliments, of the air in sewers, in school-rooms, etc. We can now detect at its very commencement, and with almost infallible certainty, an epidemic of Asiatic cholera, and institute in time the necessary prophylactic measures. The early diagnosis of tuberculosis has been facilitated.

From the point of view of direct therapeutic utility for the individual, we can only thus far boast of the preventive inoculations of Pasteur against charbon, symptomatic charbon, rabies, etc. As for rabies, it is, perhaps, not a bacillary disease, but the study of this disease has, at least, undergone development entirely upon bacteriological ground.

But we may hope that, even from a therapeutic point of view, bacteriology is entering upon an important future ; much more may be expected, it is true, for diseases of prolonged or chronic duration than for those that run a very rapid course. With respect to tuberculosis, however, all the germicide agents thus far employed in this disease have been without direct success, but this is due to the fact that our first experimentation was made on man, when we should, perhaps, have commenced by the study of the influence of these agents on cultures, then on animals.

Koch concluded by saying that he had found, after numerous experiments, many substances which are capable of preventing the development of the bacilli of tuberculosis, and this is so far a matter of great importance. The substances which succeed the best are the essential oils, certain aromatic compounds, such as β-naphthol, amine, paratoluidine, certain aniline coloring matters, such as fuchsine, methyline blue, gentian violet, auramine ; then mercurial vapors and the compounds of silver, and especially of gold with hydrocyanic acid ; thus the cyanide of gold in a solution of 1 to 2,000,000 arrests the multiplication of the microbes in cultures out of the animal organism. In animals, these substances do not avail in arresting the progress of the disease. Of late, however, he had succeeded in finding certain chemical compounds which have shown themselves to be active even when given to animals. Guinea-pigs which had been made to ingest these substances, remained refractory to the inoculation of tuberculosis. In others, already previously infected, the disease was seen to undergo regression. The name of these antibacillary agents was not given ; it is understood that the experimentation is to be continued.

If it should be confirmed that there are substances capable by their antagonistic nature of arresting the progress of tuberculosis in animals and in man, it is to be hoped that similar antidotal agents may be found for other infectious diseases.

THE EFFECTS ON NUTRITION OF ARTIFICIAL DERMATITIS.

Dr. E. Quinquaud has been performing a number of careful experiments as to the different disturbances of nutrition which follow the production of artificial dermatitis, and his experiments, which are reported in *La Tribune Médicale* for July 17, 24, and 31, 1890, have led him to the following conclusions :

1. Death may follow the production of destructive dermatitis, even if of inconsiderable extent.

2. Burns produce various disturbances in the different tissues and functions of the body. The pulmonary exhalation of carbon dioxide is immediately decreased at the time of the production of the dermatitis. Sometimes there is a transient increase, but this gives away to a gradual decline, until death takes place.

3. The quantity of oxygen absorbed follows the same oscillations ; sometimes secondary infections may be productive

of hyperthermia, and then the exhalation of carbon dioxide is inverted, and an increase is produced up to the next period of the dermatitis. The absorption of oxygen does not, however, follow a parallel course. Often the temperature, oxygen absorbed, and carbon dioxide eliminated do not follow a constant relationship, and there is thus a want of nutritive harmony produced which is very important from a physiological and pathological point of view.

4. The elementary respiration of the tissues, especially of the muscles, remains the same up to the next stage of the burn. Nevertheless, at the last moments of life, there is to be noted a diminution coincident to the fall of temperature.

5. The study of the gases of the blood permits of a slight increase of nutritive activity in the first hours following the production of the dermatitis. A prominent phenomenon is a slowing of nutrition in the capillary areas, but in certain experiments it was three times more feeble than the normal state, while the oxygen absorbed was hardly increased and the carbon dioxide was only slightly decreased.

6. Three days after the lesion the respiratory capacity of the blood commenced to diminish, and if the animal survived seven, eight, or ten days the respiratory capacity fell to one-half normal. This is, then, a symptom of the greatest importance, and will largely explain the mechanism of death as a consequence of burns.

7. The artificial lesion of the skin often produces a slight increase in the urea of the blood at first, but the increase is more manifest in the final periods, and the uræmia so resulting is likewise an important factor in the mechanism of death. The urea of the muscles and of the liver followed parallel oscillations.

8. Glucose of the blood and of the tissues commences to diminish perhaps the third day, but this diminution is feeble even towards the fatal issue, and at this time the hemorrhage may increase the quantity of glucose in the blood.

9. Hepatic glycogen diminishes rapidly towards the fifth day after the burn and all the glycogen may entirely disappear, and this also is one of the causes of death.

10. At an advanced period the dermatitis produces lowering of blood-pressure which may fall to one-half the normal height.

11. This reduction in blood-pressure may occur from the second to the eighth day after the burn.

12. Under the influence of artificial dermatitis the fermentable substances of the urine diminish. This also holds for phosphoric acid and urea and for nitrogen, these diminutions in the excretory products coinciding with an increase in temperature.

13. Under the influence of dermatitis there is a slight increase in the water in the muscles, although towards death a slight dehydration of these tissues may be determined.

14. The agents which are most hurtful to the organism are the toxic substances, probably of cutaneous origin, for the microbes in the surface ulcerations rarely penetrate into the blood.

15. Finally, the causes of death are to be found in progressive disturbances of nutrition, of which the most important are the disappearance of hepatic glycogen, the retardation of the nutritive changes in the tissues, the final prevention of tissue respiration, and the presence of toxic matters in the blood and tissues.

The question of the genesis of these accidents is, therefore, an extremely complex one, and it is this great complexity which renders the therapeutics of this condition a matter of such great difficulty.

A METHOD OF EMPLOYING ANTISEPSIS IN RECENT ANTERIOR URETHRITIS.

The above was the title of a paper read by Dr. J. William White, of Philadelphia, at the fourth annual meeting of the American Association of Genito-Urinary Surgeons, held in Altoona in June last (*Journal of Cutaneous and Genito-Urinary Diseases*, August, 1890).

His conclusions are as follows: 1. The miscropical and experimental evidence in favor of the bacterial origin of gonorrhœa is confirmed by clinical and therapeutic experience. 2. The results of antiseptic treatment have not been so uniformly successful as would be expected, on account of (*a*) the anatomical and physiological peculiarities of the male urethra, (*b*) the difficulty of applying sufficiently energetic local antisepsis, (*c*) the necessarily intermittent character of such applications, and (*d*) the failure to combine with the topical treatment appropriate internal medication. 3. No one antiseptic agent can be depended upon, in the strength at which it can be borne by the inflamed urethral mucous membrane, to completely sterilize the discharges and the suppurating surfaces. A judicious combination of several

antiseptics, if not essential to success, is at least of considerable value. 4. The internal administration of salol, in conjunction with copaiba and cubebs, renders the urine aseptic, and probably antiseptic, so that it acts as an exceptionally thorough and efficient antiseptic injection, shortening the duration of the disease and diminishing the frequency and severity of the complications. 5. The production of urinary asepsis by internal medication is of considerable value not only in the inflammatory affections of the genito-urinary tract, but in the preparation of the patient for operation upon those organs and in the after-treatment.

In the discussion which followed, Dr. R. W. Taylor did not deny that gonorrhœa might be the result of the gonococcus, but there was no proof of it other than the case of Bumm's. The micro-organisms theory was elusive in practice. He had found no good at all from retro-injections or from injections of bichloride of mercury in gonorrhœa. He did not think one could draw definite conclusions as to the efficacy of salol in this disease so long as it was used in combination with other drugs like cubebs and copaiba. Time was also a very important element in testing a drug.

Dr. Belfield thought Dr. White had taken a very rational position in the matter. In estimating the value of any drug in the treatment of gonorrhœa, we must bear in mind that the disease was often very closely simulated by something which was not gonorrhœa. A man who had had gonorrhœa might have an outbreak which closely resembled the genuine outbreak, and the clinical course of this would be much more favorable, whatever the therapeutics employed, than in case of a fresh infection of a virgin urethra. He believed gonorrhœa to be a parasitic disease, yet all the remedies which destroyed parasites had been unavailing in his hands, and he employed the purely empirical treatment of hydrastis locally and an alkali internally. He had had no experience with the combination used by Dr. White. The fact that in any given urethra about one-half of the lacunæ opened backward was, as Dr. White had suggested, an important factor in the persistence and recurrence of gonorrhœa. The lacunæ which opened backward formed a nidus for the reception of gonorrhœal poison.

Dr. F. T. Brown said he was so thoroughly satisfied as to the position of Neisser that he did all his work on the presumption that his statements were going to hold good. He had relied upon the Lafayette mixture, with the employment locally of bichloride retrojections,—1–30,000 to 1–15,000. After a week's use he generally combined a weak solution of nitrate of silver,—1–1000 to 1–2000.

Dr. J. B. White thought the preponderance of evidence was to the effect that gonorrhœa was a specific disease. He had not seen satisfactory results from deep urethral injections. He had sometimes seen considerable urethro-vesical irritation occasioned by them. He had not had satisfactory results from the use of the bichloride solution, either in the mild or strong solution. He had obtained better results from simply washing out the urethra with warm water, and then injecting a mild solution of sulphate of zinc. As a rule, he did not give any internal treatment unless the symptoms required it.

Dr. J. A. Fordyce had used in one hundred and fifty or two hundred out-patients of the Bellevue Hospital a solution of nitrate of silver in the strength of about 1–2000 to 1–4000. This gave rise in some exceptional cases to bloody urine, in others to great pain on urination, so that treatment had to be suspended or the solution made weaker. In some cases in which the nitrate of silver caused much pain he gave the Lafayette mixture internally. He thought he got better results from this weak solution of nitrate of silver than from the ordinary injections, and felt disposed to continue its use.

Dr. A. Post thought, in testing new remedies, first cases of gonorrhœa were the only ones that should be considered. He was surprised that so little value had been placed on the oil of sandal-wood, which he regarded the best of antiblennorrhagics. It certainly was equal in efficacy upon the gonorrhœa with copaiba, and much less likely to upset the stomach. His favorite injection was a very dilute solution of bichloride of mercury. He did not use injections during the acute inflammatory stage.

Dr. W. K. Otis thought salol, if efficacious, a particularly good remedy, because while giving that it would not be necessary to give injections. Even if one believed in the gonococcus, one would not give injections in the acute stage, because the gonococcus was then already out of the reach of injections, and there was a risk of causing a posterior urethritis by washing the pus down the urethra. In case of fresh gonorrhœa,

he thought recovery in six weeks was doing well. He was using injections of the nitrate of silver. Patients bore it well as strong as 1 to 1000.

Dr. E. R. Palmer believed in the gonococcus and in the antiseptic treatment of gonorrhœa. He had had some very favorable experience in the matter of irrigation. This he applied with the Kiefer nozzle rather than with the catheter. He believed that the solution of the problem lay largely in internal medication. There had been an era of internal medication in the past, but that was a blind one compared to this. There were the same objections to internal treatment as to local treatment,—the remedies used were liable to cause disturbance. Salol did not disturb the stomach, and should be given up to 15 grains three times a day. He was surprised to hear the statements as to the strength of nitrate of silver solutions used. He began in acute cases with a little citrate of potash internally and hot applications. As soon as it could be borne he used bichloride of mercury, the strength of the wash being determined by the sensitiveness of the urethra. A four per cent. solution of cocaine would relieve the sensitiveness if it were great. He sometimes also used the boric acid injection for its soothing effect. In the stage of decline he used an injection of nitrate of silver, five to seven and a half grains to the ounce. This injection was carried down fully six inches by means of the long solid silver catheter. If the patient complained of pain, he used cocaine. Such injections were given two or three times a week. Sometimes hot boric acid injections were used after them, and the patient was allowed to use at home any of the old injections.

Dr. Glenn said that during the last five years he had obtained good results from the use of weak non-irritating injections of chloride and iodide of zinc—iodide of zinc, gr. x; chloride of zinc, gr. iii; water, ℥vi—injected with a long syringe with a good nozzle. He used it at any stage that the patient would endure it.

CANNABIS INDICA IN DISEASES OF THE STOMACH.

At the meeting of the Academie de Médecine, held July 29, 1890, Professor Germain Sée reported an elaborate work as to the value and uses of cannabis indica in the treatment of neuroses and gastric dyspepsia.

After a careful study of the pharmacology of this remedy, in which the characters of the various preparations, such as cannabin, cannabinon, tannate of cannabin, and tannate of cannabinon were described, he gave an elaborate history of the various theories which have obtained as to the causation of dyspepsia and gastric intestinal neuroses, and concluded by formulating a number of propositions as to the causes in which the use of cannabis was indicated (*La Mèdecine Moderne*, July 24 and 31, 1890).

Cannabis indica, as is well known, is a complex substance, and contains a dangerous tetanizing poison, analogous to strychnine or to thebaine. About thirty-five years ago, Personne succeeded in disengaging hashish from this product, and discovered in cannabis indica the existence of a glucoside and also an ethereal oil. Three products have since been extracted from Indian hemp, and Professor Sée has particularly studied the therapeutic properties of one of them,—viz., the fatty extract,—which is prepared by dissolving by heat, in butter; that is to say, the alcoholic extract made with pure alcohol at 90°, and washed with water. It has been generally thought that cannabis indica possessed somniferous properties; but Professor Sée states this to be an error. He was struck with the sedative action which this substance possesses on the pneumogastric nerve, and he has established the indications for the fatty extract in diseases of the stomach. To comprehend them, one must be acquainted with the present state of science as far as concerns neuroses and gastric dyspepsias. The neuroses—that is, maladies without lesion of the organ—were numerous at the commencement of the century, but the microscope has gradually reduced the number, sometimes revealing a chronic gastritis and atrophy of the glands, as in cancer, the knowledge of which is only recent. But true progress in the knowledge and treatment of diseases of the stomach has been effected only since physicians have understood the part played by abnormal chemical composition of the liquids contained in the stomach. Two years ago, Professor Sée made a communication to the Academy of Medicine on this subject. He now contents himself by recalling the signification of hyperchlorhydria, organic hyperacidity, and anachlorhydria. He insists on the *rôle* of hydrochloric acid in digestion, without which pepsin, which always exists in large quantity in the stomach, is inactive. The acid not only digests, but controls abnormal fermentation. It is indispensable

that the quantity of hydrochloric acid be moderate. If from one or 1.5 per cent. it rises to three, four, and five per cent., there is hyperchlorhydria, and accidents supervene.

Professor Sée concludes his essay with the following propositions:

1. Cannabis should be employed in the form of a fatty extract, in the dose of ¾ of a grain, in three doses daily, in the form of a solution; more than this amount acquires toxic properties, the result being evident by ordinary symptoms of intoxication. The chemical principles which may be extracted from cannabis indica, such as tannate of cannabin and cannabinon, have not succeeded in the author's hands in giving precise or favorable results, without doubt because they are not the true active principles.

2. It is especially in the non-organic affections of the stomach that cannabis is indicated, and these diseases comprise two groups. The first includes the alterations of the gastric juice, among which hyperacidity, due to the excess of hydrochloric acid, is most frequent; while the second group comprises exclusively cases of gastro-intestinal neuroses, without showing any modification of the gastric juice.

3. Of the dyspeptic or neurotic symptoms, all dyspepsias may be reduced to five different classes, characterized by loss of appetite, flatulence, alteration in the digestive power, participation of the intestine, and reflex nervous troubles, either of cardiac or cerebral character. The author shows that cannabis possesses great constancy in its power to arrest painful sensations and restore the appetite, no matter what may be the diseases in which these conditions are produced. If, however, they depend upon an excess of hydrochloric acid, the administration of cannabis indica should then be associated with large doses of sodium bicarbonate, administered towards the end of gastric digestion.

The author shows, however, that cannabis has no action on the gastric contractions or dilatations, although it certainly and distinctly reduces distress, which accompanies these conditions, and which are generally designated under the name of pyrosis; further, gastric digestion is facilitated by cannabis indica, when it is retarded or prevented by loss of nerve power or the excessive pain produced by hyperacidity. Cannabis, as proved by Professor Sée, however, seems to be without any power in producing relief in the various dyspeptic troubles attributable to the amount of acid present.

Finally, cannabis seems to relieve the reflex nervous troubles associated with dyspepsia; but has no effect on the nervous dispositions resulting from this cause, such as hypochondriasis, hysteria, or neurasthenia.

In conclusion, Sée maintains that cannabis is a true sedative to the stomach, and without any of the inconveniences of the narcotics.

THE RECOGNITION AND PROGNOSIS OF ACUTE PAINLESS DRY PLEURISY.

In the *Medical Record* for August 2, 1890, Dr. R. Vansantvoord reports three cases of pulmonary trouble, which are especially interesting, as showing how comparatively trivial cases of pleurisy may be confounded with commencing pulmonary phthisis.

The first of these was that of a boy, aged 11, whose previous health had been good, except for nervous symptoms due to ocular defects. His illness dated from a chill, caused apparently by exposure. This was followed by cough, slight, but not constant, elevation of temperature, and general depression out of proportion to any manifest disease. Moist, superficial subcrepitant sounds were heard along the anterior border of the left upper lobe a week after the chill, cough with slight expectoration continuing. The superficial subcrepitant sounds extended finally over almost the whole surface of the left lung. For several days they were always present at every examination, and then gradually disappeared in about two weeks from their first appearance. During this time no pain whatever was felt. No morbid sound whatever was heard over the right lung, except an occasional coarse rhoncus. Towards the latter part of the case a slight feeling of traction was felt by the patient on deep breathing.

The patient made a complete and speedy recovery under rest, moderate counter-irritation, and tonics, mainly.

The second case was that of man, about 45 years of age, with a florid complexion, rather stout, and disinclined to take much exercise. He had a short time previously suffered from an attack of influenza during the late epidemic, went back to business, and had to lay up again, suffering from a severe cough without much expectoration, much prostration, slight elevation of temperature, and neuralgia of one supra-orbital nerve, a complaint to which he had long been subject. Physical examination showed superficial subcrepitation over the lower right lobe. There

was no dulness appreciable. There was absolutely no pain on breathing or coughing, only the patient said that his cough "came from his right side." Under quinine and arsenic, with occasional doses of phenacetin, and very small doses of aconitine for his neuralgia, the patient was entirely convalescent in two weeks, slight subcrepitation still existing, when, owing to his complete recovery as far as subjective symptoms were concerned, he was allowed to pass from under observation. His urine was normal.

The third case was that of a lady approaching middle life. She had been subject for some years to cough with expectoration, and had gradually become considerably emaciated. She was seized with intense dyspnœa during the night, having had a chill during the previous day. The pulse was rather feeble. Weak emphysematous respiration was present over the whole right lung. At the left apex there was dulness and hollow breathing, which persisted after convalescence from her acute trouble, and was evidently due to an old lesion. Over the whole of the left lung was to be heard superficial subcrepitation. She passed six hundred and ten cubic centimetres of acid, turbid urine in twenty-four hours, containing albumen, which formed a bulk of ten per cent. on depositing, urea about nineteen grammes, and numerous hyaline and granular and a few epithelial casts. Its specific gravity was 1.022. The subcrepitant sounds followed the same course as in the two preceding cases. The dyspnœa was intense and agonizing for some days. Neither pleuritic pain nor effusion that could be recognized followed. In spite of an extremely unfavorable prognosis, given by a prominent consultant, she gradually regained strength, the slight fever from which she had been suffering and the subcrepitation disappeared; her urine became normal, and she has returned to her occupation as a schoolteacher in a tolerably comfortable condition. Cardiac tonics and Basham's mixture were the main therapeutic agents used. Cough and expectoration, she thinks, is less than before the acute attack, but she suffers considerably from dyspnœa. Owing to an almost morbid sensitiveness about having her case investigated, the author was not able to obtain a specimen of her sputum for examination.

The first point of interest about this little group of cases is the latency of their course so far as subjective symptoms of pleurisy were concerned, though all suffered more or less from cough. A second point is, that in none of them, though repeatedly and carefully examined, did there ever occur a rough friction-sound. In all the only physical sign was a subcrepitation, not distinguishable in quality of sound from an intrapulmonary râle. In fact, in two of the cases the sounds at first were regarded as intrapulmonary. As they extended, however, their pleuritic origin became evident from their superficial character, the fact that extensive areas of a single lung was in each case involved, and the constant presence of the sounds day after day in the same place. Had they been due to bronchial râles they would have been bilateral, inconstant, and affected by cough. All systematic writers call attention to the fact that pleurisies occur without characteristic symptoms, and probably sometimes without physical signs. In practice, however, inflammation of the pleura is not likely to be thought of, unless it is suggested by pain or extensive effusion. This is particularly apt to be the case when the physical indication of the lesion is not a rough, grating murmur, which cannot be readily misinterpreted, but is, as in the above cases, not distinguishable in quality from intrapulmonary sounds. The possibility that râles, coarse and fine, may be of pleuritic origin was recognized by Walsh, in 1842. This is to-day recognized by all authorities, Dr. J. R. Leaming going so far as to teach that almost all râles are of pleuritic origin, a position which can hardly be recognized as conformable with what seems to be facts to most observers.

Dr. Vansantvoord further claims that if the crepitant râle of pneumonia is a pleuritic sound, as Dr. Leaming maintains, in that case its persistence through the varying stages, from consolidation to complete resolution of the pulmonary exudation, is not conceivable on the theory of its production in the alveolæ. The crepitant sounds heard at the apex in early phthisical consolidation are usually spoken of as râles indicative of local bronchitis; but, although Drs. Leaming and Loomis regard them as indicative of pleuritic exudation, in cases similar to those reported by Dr. Vansantvoord the distinction between pleuritic and intrapulmonary sounds is of primary importance in diagnosis, and therefore in the formation of a prognosis. It is customary to divide pleurisies etiologically into primary, or those which arise apparently from causes acting exclusively on the pleura, the pleurisy being the main disease, and secondary, or those which occur as a local

manifestation of a general disease or from the extension outward of some lesion of the pulmonary parenchyma. In the case of the peritoneum, as knowledge has extended, primary or idiopathic inflammation has about disappeared from our nosology. In a case of peritonitis not due to direct traumatism we look for some general disease or infection of which it is a local manifestation, or a lesion of some pelvic or abdominal viscus of which it is the extension. The same mental attitude ought to be assumed in all inflammations of the pleura, although much still remains to be discovered in this field. In a recent analysis of one hundred and sixty-three cases of pleurisy, apparently primary, occurring in the Zurich clinic in the course of ten years, Engsten found seventy-one in which no known cause could be found. In twenty-two cases there was phthisis in the family. In thirty-one cases exposure to cold was given as the cause, twenty-nine of them being pleurisy with effusion and two only dry. In many of these cases the pleurisy followed a few hours after a definite exposure to chill. Four cases were attributed to overexertion, one to injury without recognizable lesion of ribs or skin, sixteen had pneumonia, and seventeen pleurisy on previous occasions; two occurred in childbed. An attempt is made by the author to show that these cases occurred in groups, and to deduct from that fact the probable infectious origin of the cases, but his figures are too small to be very convincing.

In the first case reported the author states that the general depression of the patient was altogether out of proportion to the local disease, and that he was really dealing with a general disease of an unknown nature, of which the pleurisy was a local manifestation.

In the second case the prostration is, of course, readily accounted for. Whether or not the pleurisy was a local manifestation of the disease, or an intercurrent complication due to some other cause, the author is not prepared to say.

In the third case,—viz., that of a lady with a history of a cough and emaciation, with a cavity in one lung, and with albumen and casts in the urine,—at first sight pulmonary tuberculosis, the often accompanying chronic nephritis, and a tubercular process seemed only too probable. As the patient, however, regained a relative degree of health in a short time, the probability seemed that the old pulmonary disease was a chronic bronchitis and emphysema, with a bronchiectatic cavity at the left apex, that the kidney-trouble was acute, and that both kidney and pleural lesion were due to some infectious agent, the onset of the disease beginning abruptly with a chill and all passing off in a few weeks, leaving the patient, as far as her pleura and kidneys were concerned, as it found her.

As regards the prognosis of such cases as present the physical signs of pleurisy and nothing more, a number of points are brought out by the author which are well worthy of attention. In 1885, Sir Andrew Clark called attention to the frequency with which fibroid phthisis develops from what in its inception is apparently dry pleurisy, often very latent symptomatically. From the pleura the fibroid process, which is generally unilateral, extends into the pulmonary parenchyma, until the lung is more or less extensively crippled. The desirability of detecting such a case at the onset is too obvious to be insisted upon. It is, perhaps, not probable that any of these cases belonged to that category, as all began, progressed, and departed like acute infectious diseases. While few physicians will to-day question the etiological importance of the tubercle bacillus, it is generally recognized that a predisposition on the part of the patient, consisting either in constitutional or local vulnerability, is essential to the implantation of the disease. A pleura damaged perhaps by just such a latent process as those above cited, and not properly treated, simply because a proper diagnosis has not been made, may prove just such a predisposing cause.

The cases above reported by Dr. Vansantvoord are especially valuable, as drawing attention towards the occurrence of inflammations of the pleura, which are nearly or quite symptomatically latent, and to suggest the importance of their recognition. Diagnosis is often, as in the three cases cited at the beginning of the paper, not difficult, if only the possibility of their occurrence is kept in mind and an intelligent analysis is made of the physical signs noted on repeated examination and of the history of the cases. Such cases come under the observation of the general practitioner rather than of the specialist. Upon him devolves the grave responsibility of diagnosing and treating most diseases in their incipiency. Upon the breadth of his knowledge, the acuteness of his powers of observation, and the soundness of his judgment hangs the fate of the patient, rather than upon the skill of the specialist, who often is consulted only after disease has

progressed beyond remedy. The task, especially of stamping out that great scourge of our race,—pulmonary tuberculosis and its kindred diseases,—devolves upon the great body of the profession. The habit should be more generally cultivated by us all of observing the constitutional tendencies of patients, and even when the disease in question in a given case is trifling, we should systematically look beyond the present disorder and consider what light it sheds upon the patient's future prospects.

FUNCTIONAL DISORDERS OF THE HEART.

At the meeting of the British Medical Association, at Birmingham, on July 29, SIR DYCE DUCKWORTH read a paper with the above title (*Lancet*, August 2, 1890). He said: "Cases illustrating what we commonly term functional disorder of the heart are frequently met with in practice. The whole subject has certainly become better defined for us since the knowledge of cardiac physiology and the due recognition of physical signs relating to the heart have become part of the common knowledge of the profession. The remarks I propose to make shall refer to conditions of cardiac disturbance and of vascular disturbance which can fairly be held distinct from all such as are plainly associated with, if not dependent on, organic diseases of the heart or the great vessels. We apply the term 'functional' here, and I maintain the use of the term as necessitated for clinical practice, *pace* the purists and the physiologists, whom indeed we often have to part company with to meet the claims of the bedside. Our aim as hospital teachers is to make good practitioners, men who can treat and heal the sick. That, I say, is our whole business. Our subject to-day relates to irregular and inordinate action of the heart and blood-vessels. I shall clear the way for this discussion by treating the subject of functional cardio-vascular and rhythmical disturbance in the following order: (*a*) Infrequency; (*b*) intermittency; (*c*) irregularity; (*d*) inordinate frequency (tachycardia); (*e*) inordinate vascular pulsation. Infrequent pulse is not often met with; sometimes it appears as a constitutional peculiarity, not more than thirty or forty beats occurring in the minute. Such infrequency may accompany convalescence from acute diseases. The most marked instances within my own knowledge of the class of cases I now refer to arose apparently as a result of the influence of malarial poison. The results of injuries to the head causing infrequent pulse may be recalled. In the acute cerebral disorders infrequency may suddenly give way to extreme frequency or to irregularity. In any case of infrequency there are no facts, so far as I know, to justify anxiety or a grave prognosis in respect of longevity. I take next intermittent action of the heart, that condition of pulse known as arhythmia. It may be affirmed that irregularity is commonly of graver import than mere intermittency. In any case the gravity is to be determined by careful physical examination of the heart and radial pulses. Habitual intermittency may be compatible with a full term of life and a heart practically sound. Intermittency may pass off temporarily under the stress of an acute illness with pyrexia, and return with the re-establishment of health. The cause of temporary intermittency is not uncommonly irritation set up by dyspepsia. We may speak of two forms of intermittent pulse: (*a*) where the condition is constant, and (*b*) where it is only occasionally induced. If the intermittency be constant, the patient is generally in middle or advancing life. He may be quite aware of any cardiac irregularity, or may subjectively realize the thump of the organ as a more vigorous beat succeeds to the intermission. This condition is not of serious import in the absence of any marked signs of heart-failure or arterial decay, and is compatible with advanced longevity. Intermittency of the pulse is often associated with the gouty habit of body; it may be an abiding condition or only temporary. I am inclined to believe that the gouty habit induces irregularity rather than intermission of cardiac action. The intermissions may be only occasionally present as the result of some dietetic error or dyspeptic condition. By irregular cardiac action is signified irregularity of rhythm and inequality of tension. The pulse is irregular in force and volume. This is sometimes a temporary condition, due to dyspepsia more often than to any other cause, especially flatulent dyspepsia. Emotion may likewise induce this. Prognosis in any case will depend altogether on the textural soundness of the heart. Though occasionally met with in fatty degeneration of the cardiac muscle, it is more often absent than present. The disturbances of the heart's action which depend on a gouty habit of body are very noteworthy. The special significance of palpitation, apart from organic disease,

varies greatly. The patient may or may not be conscious of undue or violent cardiac action. It is either temporary or persistent. Dyspeptic disturbance is often to blame for the temporary form. In the abiding varieties there is commonly profound nervous disorder. In accentuated form, the malady known as Graves's disease presents this as one of its three cardinal symptoms. Dr. Samuel West has noted examples of paroxysmal heart hurry not dependent on any permanent recognizable disease of the heart, though temporarily accompanied by dilatation and murmur. Dr. Bristowe first called attention to cases of this nature, styling them instances of 'recurrent palpitation of extreme rapidity in persons otherwise apparently healthy.' It is probable that under the name palpitation several varieties of cardiac disturbance may have to be differentiated. As antecedents of several of the recorded cases, it is to be noted that rheumatism and syphilis figure, and that undue strain is often the exciting cause of paroxysms. These facts appear to me to justify Dr. West's views in respect of their pathogeny rather than those of Dr. Bristowe. Inordinate vascular pulsation is well recognized as a functional disorder. It is found in the abdominal aorta in conditions of anæmia, and after hemorrhage due to gastric ulcer. I have followed some of these cases—when death has supervened from other causes—to the post-mortem room, and have never found any gross morbid anatomy for them. The conclusion is, therefore, clear that they are dependent on disordered nervous conditions. Hysterical palpitation is a well-marked variety. Emotion, fits of bad temper, and fright are provocative in persons already disposed. The gouty habit of body is certainly a cause. The palpitation may be entirely subjective. Examples of what is termed irritable heart come into this large category. These occur most frequently in young men who take violent exercise and live hard in all ways. Graves's disease is an exquisite example of a cardio-vascular disorder dependent on neurotic influence. Balfour, of Edinburgh, teaches that nervous origin of any case of palpitation may be ascertained by making the patient exert himself. Extra exertion has the effect of subduing the rapid action. With organic lesion (such as fatty change) present, the contrary effect will ensue. In the superficial sketch which I have now presented to you, I have endeavored to consider only such conditions of cardio-vascular disorder as are, for want of a better term, called functional. There is as yet no morbid anatomy for them, yet for many of them the line is apt to be transgressed, and in time there are found changes in the direction of decay by atheroma, fatty degeneration with fatal issue. Have we not here the earlier manifestations of organic disease-changes indeed, but such as may often be recoverable if early detected and wisely treated?"

THE ACTION OF THE SOLUBLE SALTS OF STRONTIUM ON THE ORGANISM.

Dr. J. V. Laborde has taken up the study of the salts of strontium, potassium, and calcium, and reports his results in *La Tribune Médicale* for July 17, 1890. These studies possess considerable importance, especially from the point of view as to the relationship between the toxicity of a metal and its atomic weight, together with their possible applications to the arts and in therapeutics. Commencing with a comparative study of the chloride and lactate of strontium, Dr. Laborde, in the first place, calls attention to their almost perfect innocuousness.

Gmelin, in his studies as to the action of barium, strontium, and chromium on the animal organism, in 1824, deduced from his experiments that strontium and its soluble salts are perfectly harmless, but he selected for his experiments the rabbit, which, as is well known, is almost incapable of vomiting, and thus in this respect is unfavorable for practical deductions from such experiments. Dr. Laborde, on the other hand, pursued his studies principally on the dog, and, in one case, on man, employing intravenous, hypodermic, and intramuscular injections, and introduction into the stomach by means of the œsophageal sound; and he now believes that his results warrant him in stating that the chloride of strontium is absolutely innocuous, he having given it in the dose of 7½ grains to a rabbit weighing only five pounds without producing any appreciable phenomena whatever, even no local disturbance. So, also, in the dog he has given 15 grains of the chloride of strontium directly into the vein without likewise producing any apparent disturbance either of the circulation, respiration, or the digestive functions. So, also, 30 grains of the carbonate of strontium were given daily to a man (?) without producing any discoverable effect.

In comparing the action of the chlorides of

strontium and barium, one would at first expect from their close chemical relationship that there would be a somewhat close analogy between their physiological properties, but Laborde has found that the chloride of barium possesses strong toxicity, while, as we have seen, the chloride of strontium is practically inert. These facts, it should be mentioned, were also noted by Orfila and Gmelin, and, in 1883, Rabuteau likewise noted the same results. Laborde, however, takes exception to the methods of experimentation used by these different observers, although he likewise has found by more careful methods of study that when a solution representing about two grains of the chloride of barium was injected into the external saphenous vein of a dog weighing thirty pounds, the pupil was dilated, the urine abundant, and death was produced by arrest of the respiration, so that Rabuteau's experiments, which attribute death to arrest of the heart, are explainable as due to his method of investigation, and not to the action of the drug.

Laborde, therefore, describes the chloride of barium as a respiratory or medullary poison and not as a cardiac poison. Further, Laborde has noted that, as a result of poisoning with chloride of barium, there is the same arterial hue of the blood preserved as is the case in poisoning by oxide of carbon. Again, in comparing strontium salts with similar salts of potassium, while the former is free from any marked poisonous action, the chloride and sulphate of potassium, as is well known, produce paralysis of sensibility and motion, collapse, and asphyxia, while first producing slowing and finally arrest of the heart. These results follow whether the salts are given intravenously or through the stomach, though in the latter case there are marked gastro-intestinal symptoms, such as diarrhœa and vomiting. Again, Laborde finds that the salts of strontium and calcium are very closely allied in innocuousness, though chloride of calcium may produce vomiting when injected intravenously, a result which never follows the use of the chloride of strontium.

Finally, in comparing the action of the lactate of strontium and potassium, the same results were obtained,—that is, the strontium salts were innocuous, potassium salts poisonous.

Dr. Laborde, however, claims to have noted a result obtained in his experiments which may be of interest for therapeutic applications, and that is that the administration of the lactate of strontium by the stomach to the dog produces marked diuresis. He has not, however, studied the mode of production of this diuretic effect, but promises to contribute later the results of the studies on which he is now engaged, so that the practical result now is that strontium salts are apparently negative in their action as regards any poisonous effects, while lactate of strontium possesses certain properties as a diuretic.

A NEW METHOD OF EXAMINING THE LIVER.

A new method of examining the liver, more especially its lower border, is proposed by GLENARD (*Weekly Medical Review*, August 2, 1890). The patient lies on his back, while the physician, sitting to his right, on the edge of the bed, passes the four fingers of his left hand under the right hypochondrium of the patient, so as to press out the lumbar region, while the thumb, applied more anteriorly, makes gliding motions from below upward. If the patient now makes deep inspirations, the thumb will distinctly feel the lower margin of the liver.

ARTIFICIAL AND NATURAL DIGESTIONS.

The use of artificially-digested foods is every day attracting more and more attention, and we, therefore, reprint the following paper by MR. A. S. LEA (*American Journal of Pharmacy*, August, 1890) as a timely contribution to the subject.

The following factors, present in normal digestion, are absent in artificial digestion experiments as usually performed in flasks and beakers: 1, constant movement of the contents; 2, constant removal of digestive products; 3, continuous additions of fresh portions of digestive fluid. In the present experiments, an apparatus was employed which tends to obviate these disadvantages. The artificial digestion is carried out not in a flask, but in a tube of parchment-paper, kept in constant up-and-down movement by connecting it to a motor; this tube is suspended in a cylindrical glass vessel filled with the same mixture as that contained in the tube, but minus any ferment; an outer cylindrical glass vessel is filled with water, kept at the necessary constant temperature. By this means, two of the more important conditions under which natural digestion

takes place may be imitated,—namely, continuous movement, and removal by dialysis of digestive products.

The first question investigated was the digestion of starch by saliva; the great contrast between natural and artificial digestion of starch is the appearance of large quantities of dextrin in the latter case (opinions, however, differ as to the relative amounts of sugar and dextrin formed), while in the stomach and intestines mere traces of the dextrins are discoverable. Notwithstanding imperfections in the present method of experimentation, which are freely admitted, the contrast between a digestion carried on in the moving dialyser and in a flask is very marked; the iodine reaction of starch or dextrin disappears first in the contents of the dialyser; in prolonged digestions the contents of the dialyser remain clear and more free from putrefactive organisms than those of the flask, and the proportion of dextrin present is less in the dialyser than in the flask. This last point may be illustrated by the following table:

	Duration of experiment in hours.	Strength of starch in solution per cent.	Dextrin per cent. in dialyser.	Maltose per cent. in dialyser.	Maltose per cent. in dialysate.	Dextrin per cent. in flask.	Maltose per cent. in flask.
1.....	6	0.4	7.67	.....	.....	15.23	.....
2.....	22	2.4	8.58	.....	.....	14.16	84.23
3.....	21	4.23	16.78	.....	.....	3[illegible].62	61.81
4.....	68	4.23	8.48	.....	.....	35.70	62.33
5.....	18	0.43	10.31	12.42	76.67	.....	.....
6.....	48	4.18	12.61	14.20	71.15	.....	.....
7.....	90	3.35	4.29	3.06	91.18	.....	.....

The conclusions drawn from these and similar experiments are as follows:

When the digestion of starch by saliva is carried out under conditions which insure a very considerable removal of the products (maltose) as they are formed, then,—

1. The *rate* at which the digestion takes place is increased.

2. The total *amount* of starch converted into sugar is much greater, and the residue of dextrin is much less, than under conditions, otherwise similar, when the products are not removed.

3. The influence of the removal of digestion products on the relative amounts of dextrin and maltose formed is least marked when the starch solution is dilute.

4. These results justify the assumption that in the alimentary canal starch is completely converted into sugar before absorption.

5. The experiments afford no evidence that any sugar other than maltose is formed by the action of saliva on starch.

CHLORIDE OF METHYL AS A LOCAL ANÆSTHETIC.

In 1884, Debove first used chloride of methyl in sciatica with brilliant results. Later Vinay, Baily, Tenneson, and Begue employed it as a local anæsthetic in various forms of neuralgia, rheumatic muscular pains, traumatic periostitis, and pains in the joints, while Vidal, Labbe, St. Germain, Pollaillon, Cazin, and Perier have employed it as a local anæsthetic in a large number of minor surgical operations with satisfactory results.

Professor Kusmin, of Moscow (*Centralblatt für Chirurgie*, No. 31, 1890), has recently taken up still further the applicability of chloride of methyl in operations, and concludes from his numerous experiments made on dogs, in which he was not only able to anæsthetize the skin, but also the deeper tissues in the amputation of the leg of a dog, that it was possible by its means to produce anæsthesia which will last from one and a half to two seconds, a time which is quite sufficient for opening abscesses. As the anæsthesia of one and a half to two seconds may be repeated a number of times during the same operation without damage to the tissues, and as not only the skin, but also the muscles, and even the bones, may be made insensible by its employment, chloride of methyl has the great advantage, especially over ether, in that it more readily produces anæsthesia, and does not burn, and may even be administered where the thermo-cautery is employed, and is even capable of producing sufficient anæsthesia to enable major operations, such as amputation.

Dr. Kusmin uses Vincent's apparatus, and directs the stream directly on the part which is to be anæsthetized, or first covers the part which it is desired to render insensible with a little cotton wool, first moistened with chloride of methyl. In the latter case the anæsthesia is slower, not being produced so soon and not being complete before five minutes.

In addition to opening a large number of abscesses, Dr. Kusmin employed the chloride

of methyl in his clinic for the following operations: four cases of phimosis, two cases of strangulated hernia, two cases of atresia, two for cancer of the lip, one for the removal of a dermoid cyst as large as the fist from the head, and one in which glands were excised from the neck. The results were all satisfactory.

SIMULO.

Dr. V. Paulet reports a number of cases of hysteria treated with simulo, in which it appeared to have decidedly good effects. He also employed the drug in a case of ovaritis with severe pain, and one of double pregnancy accompanied by nervous palpitations, violent headache, and complete insomnia, and obtained absolute relief in both cases. As regards its use in epilepsy, he does not think that it can supplant the bromides, but that in some cases and under certain conditions, not very well defined as yet, when the bromides seem inefficacious or contraindicated, it may be very useful. In one of his cases also chorea was apparently benefited by simulo.

The alcoholic tincture of the drug is a bad form for administration in epilepsy and hystero-epilepsy, since, if given in any quantity, the alcohol may neutralize the good effects.

As regards the safety of the medicine, he considers it quite innocuous in large doses. It appears to have, he says, no effect on the pulse or respiration; it causes no depression, no mental excitement, and no disorder of digestion.—*American Journal of Insanity*, July, 1890.

SALIPYRIN OR SALICYLATE OF ANTIPYRIN.

In a communication made by M. Vigier to the Paris Pharmaceutical Society, more than a year since, attention was called to the reaction which occurred between antipyrin and sodium salicylate. This reaction has been thoroughly investigated by Professor Spica, of Florence, who reports (*L'Orosi*) that the liquefaction of the mixed powders is due not to the formation of salicylate of antipyrin but simply to absorption of moisture from the atmosphere. He also states, however, that he has succeeded in preparing a well-crystallized compound, which he considers a salicylate of antipyrin, and which he thinks may prove of therapeutic value. He obtained the salt by gradually adding to a dilute boiling aqueous solution of antipyrin a molecular proportion of salicylic acid (100 parts of antipyrin to 73.4 of salicylic acid). If the solution be sufficiently dilute it remains clear while boiling, otherwise a yellow, oily substance will separate out, which requires recrystallization from water. The salt is described as occurring in fine colorless crystalline scales, or in flocks formed of very much elongated crystals, the scales tending to group together. These scales are soluble in 25 parts of cold and more soluble in hot water, and freely soluble in alcohol, ether, chloroform, and carbon bisulphide. Since the publication of Professor Spica's observations, Dr. Scholvein has stated that this compound has been already tried in the Berlin hospital under the name of salipyrin with satisfactory results. Dr. Scholvein also suggested, as a simpler method of preparing the compound, that the components be heated together in molecular proportions, and the resulting crust be dissolved in and crystallized from alcohol. It may also be obtained by shaking together an aqueous solution of antipyrin and an ethereal solution of salicylic acid, when the compound separates out in handsome crystals.—*Druggists' Circular and Chemical Gazette*, August, 1890.

TESTS FOR GLYCOSURIA.

According to the Vienna correspondent of the *Medical Press* for August 27, 1890, for some time past the tests for sugar in the urine have been the subject of controversy and investigation, many of which were considered inaccurate and others worthless. A few weeks ago Professor Nothnagel read a letter at the K. K. Gesellschaft der Aerzte, from Dr. Becker, of Cairo, who enclosed him his visiting-card prepared in such a way that if a drop of urine were placed on the card with a match glycosuria could be instantly detected. The professor tried the card test and spoke very highly of the result, after reading the letter to the meeting. Since then the brothers Drs. Jolles, of the Chemico-Microscopic Laboratory, Vienna, have collected and examined four hundred analyses of saccharine urine with a view to settling the dispute between the claimants for the different sugar tests. In preparing their argument they divide saccharine urine into two different kinds for applying tests. 1. Those where sugar is present but the urine is healthy in every other detail, constituents chemical and physical, which may have sugar present to the extent of .4 to .5 per cent., increasing

or diminishing, but never disappearing. 2. Where both the physical and chemical properties are changed, the specific gravity increased, the color pale yellow, the uric acid reduced and replaced by aceton or acetic acid. In these cases the sugar is usually in very large quantities, but may be modified by therapeutic or dietetic treatment. The tests applied in the laboratory are long, tedious, and impracticable for the bedside.

The visiting-card adopted by Becker, where he has the surface of the card covered with a concentrated solution of cupric sulphate, which evidently forms cupric oxide on the surface of the card on drying, is an excellent and convenient test for practical work. But here is a likely error. The paper in Becker's visiting-card contains a small quantity of potassium in its texture, presumably from the manufacture of the card with potassium carbonate.

This one can easily demonstrate by a drop of phenolphtaline, which produces a red color when a trace of potassium is present. The authors state that they have tested thirty visiting-cards from different provinces, and not a trace of potassium was found in one of them ! Such cards, if covered with the cupric solution of vitriol, would prove erroneous for diagnosis. A filter-paper with a resinous soap incorporated might be more reliable for the reaction, which is nothing more than Trommer's test modified. Two conditions are necessary,—sensitiveness and a distinguishing color. The first of these is obtainable, but the second is not reliable. With Becker's test in albuminous acid urine characteristic "browning" has been obtained, where not a trace of glycose was present. Trommer's test at best is worthless, and Dr. Jolles has found cases where this test has been tried for upward of a year, and misled the physician in his diagnosis. Heller's test is also unreliable. Seegen's test, which is a modification of the above, by filtering the urine through carbon to remove the creatins, is not much better. The action of uric acid, oxybutyric acid, etc., disguises the result of Fehling's test, and makes it also unreliable. Another objection is the quantity of glycose present before any of these tests can be applied. In Trommer .32 per cent. is required ; Seegen's .20 per cent. ; while Heller's requires .48 per cent., a quantity too great for practical diagnosis. According to the writer's judgment there are only two reliable tests known to us at present,—viz., Böttger's bismuth test and Fischer-Jaksch's phenylhydrazin test.

Böttger-Nylander's Test.—The first of these has been recently modified by Nylander with regard to quantity. He prefers 2 of a basic salt of the potassic nitrate of bismuth, 4 of the potassic tartrate of sodium, and 100 of an eight per cent. sodic solution. Of this solution, 1 part is taken to 10 parts of urine, which is boiled one minute, but never exceeding two minutes, when a dark solution will be obtained on cooling from the oxidation of the bismuth. This is a very sensitive test, detecting the presence of .08 per cent. of sugar. It is necessary, however, before applying the test to remove any large quantity of albumen and mucin from the urine, or the presence of the sulphur in those bodies may combine with the bismuth. Another condition is, that the solution must not be boiled too long, or the organic matter in the urine may become black. There are also a few medicines enumerated that falsify the results.

Fischer-Jaksch's Test.—This is a test depending on the formation of a phenylhydrazin glycose, which is deposited in the form of yellow crystals or plates ; but brown globules are no proof of the presence of sugar. Six to seven centimetres of urine are taken, to this is added twice as much as will go on the point of a knife—"zwei messerspitzen voll"—of the salt of phenylhydrazin, with three times as much as will lay on the point of a knife of the acetate of sodium, and then heat is applied, but if the salts will not dissolve more water is added. This mixture is placed in boiling water, allowed to remain from twenty to thirty minutes, and then removed to a beaker of cold water, when the yellow crystals or plates of phenylhydrazin glycose will fall to the bottom, and are easily distinguished by the microscope. The chemistry of the test is described as one molecule of phenylhydrazin combining with one of glycose, at the time of cooling giving the formula—

$$C_6H_{12}O_6 + N_2H_3C_6H_5 = C_6H_{12}O_5N_2H_3C_6H_5 + H_2O,$$

which, when further heated, two molecules of phenylhydrazin and osazone are formed in yellow crystals, insoluble in water and slightly soluble in alcohol.

CONDITION OF THE KIDNEYS IN POISONING BY MERCURY.

Some experiments that may prove of interest from a medico-legal, as well as from a clinical, point of view, have been made by a

German observer, F. KLEMPERER, and an abstract of his results is given in the *Centralblatt für Klinische Medicin*, 1890, No. 29. The investigations were made to ascertain the condition of the kidneys in death from poisoning by mercury. The experiments were mostly made on rabbits, and the poison (corrosive sublimate) was introduced into the system by means of hypodermic injections. The mercury was eliminated by the intestines and kidneys. In acute cases, when the amount of mercury was large and death rapid, a considerable amount of congestion was found in the kidneys. If life was prolonged five to ten hours, hemorrhages were found in these organs, chiefly in the parenchyma, and there was also cloudy swelling of the epithelium. If the duration of life was still longer, the parenchyma showed marked signs of inflammation. These were seen to some extent in the tubules of the cortex, but were less obvious there than in the straight tubules; in the latter inflammation quickly led to necrosis. In half the cases there was a deposition of chalk, together with a degenerative parenchymatous inflammation; the former appeared from eighteen to twenty-four hours after death, at first in the casts found in the diseased tubules, and similar deposits occurred later in the straight tubules. Added to the above conditions was generally a slight affection of the glomeruli. When the poisoning became more chronic, the parenchymatous inflammation was less marked. The necrosis of cells in the straight tubules occurred only to a slight extent, and calcification was absent; but in the interstitial tissues the signs of inflammation were abundant. In the kidneys of dogs poisoned by mercury, there was a parenchymatous nephritis, which terminated not in necrosis, but by fatty degeneration of the cells; a deposit of chalk only occurred to a very limited amount. In cases of metallic poisoning the condition of the kidney is very similar in rabbits to that in man, but in the latter fatty degeneration is more common than in the former. The microscopic and macroscopic characters of the kidneys are not so characteristic as to warrant a diagnosis of mercurial poisoning; poisoning by manganese, glycerin, bismuth, all produce much the same appearances, but the deposits of chalk in the inflamed tissues would suggest that mercury was the irritant employed. Professor Kauffmann ascribed all the changes produced by mercury to coagulation in the capillaries, producing indirect anæmia, in the wake of which necrosis and calcification followed. Klemperer, on the other hand, was of the opinion that there was no simple necrosis and no definite form of inflammation produced by the action of mercury, but he attributed the results to a proneness on the part of the cells of the kidney of the rabbit to undergo calcification, while the same irritant produced in the dog a fatty metamorphosis of these cells.—*Lancet*, August 23, 1890.

DELPHINIUM STAPHISAGRIA.

The seeds were analyzed by Charalampi Kara-Stojanow (Inaugural Dissertation, Dorpat). Delphinine and delphisine have the same composition, $C_{31}H_{49}NO_7$; crystallize from their solutions in ether and petroleum benzine, the form of crystals being alike; their melting-points are almost identical (191° and 189° C.). They give no color reactions and dissolve freely in chloroform. Greater differences were observed in their behavior to water, alcohol, ether, and benzol. Delphinine has an acrid and benumbing taste, while the taste of delphisine in alcoholic solution is bitter, a burning sensation being left on the tongue. Delphinoidine is amorphous, melts at 152° C., has a bitter, scarcely acrid taste, is soluble in ether, and yields amorphous salts, which are soluble in water. The mixture of alkaloids insoluble in ether, which has been known as staphisagrine, was found to consist of at least four alkaloids, all of which are amorphous and have a bitter taste. The physiological action of the different alkaloids was determined by Professor Kobert; they do not enlarge the pupil, but otherwise resemble aconitine in their action, though decidedly weaker than the latter alkaloid, and differing more or less among themselves. The closest relation to aconite is shown by delphinine, but the lethal dose for cats and dogs is 1.5 ($\frac{1}{40}$ grain) and .5 milligramme respectively for the two crystalline delphinium alkaloids. Delphinoidine has a more decided narcotic action, the lethal dose being 5 milligrammes.—*American Journal of Pharmacy*, August, 1890.

THE TREATMENT OF WHOOPING-COUGH BY BROMOFORM.

Bromoform, $CHBr_3$, is a colorless liquid, boiling at 151° C. and solidifying at 2.5° C. Its specific gravity is 2.83 at 0° C. It is produced by the action of bromine upon alcohol

in the presence of an alkali. In practice, milk of lime is saturated with bromine, alcohol added, and the mixture distilled. In 1849, Nunneley and Schuchard called attention to bromoform as a possible anæsthetic, and in 1869, Rabuteau brought the drug forward as a new anæsthetic.

Given to the lower animals by inhalation or hypodermic injection, bromoform produces rapid narcosis, in which, according to the researches of Von Horoch, the breathing is not noticeably lessened, and the pulse remains full, regular, and strong. Although the blood-pressure is distinctly reduced, the heart is said not to suffer from the influence of the drug, and the peripheral vagi are not affected. Further, as powerful irritation of a sensory nerve has no influence upon the blood-pressure, it is probable that the fall is the result of vaso-motor paralysis, which is confirmed by the rapid sinking of the temperature.

The excitability of the cerebral psycho-motor centres and the general reflexes are entirely destroyed. Von Horoch has used the bromoform as an anæsthetic in several cases in man. The most marked symptom was excessive cyanosis of the face. The urine passed after recovery contained bromine.

More recently Dr. Stepp, of Nuremberg, as published in a recent number of the GAZETTE, applied bromoform successfully in the treatment of whooping-cough, and still more recently Professor Senator, through his assistant, Dr. Löwenthal, of Berlin, published an article heartily endorsing Dr. Stepp's treatment and recommending its further use, promising to again publish his results.

He noticed in some cases a decided benefit as early as the second day of treatment: in others on the third or fourth day, depending on the severity of the case.

Vomiting disappeared in the first week of the bromoform treatment. Bronchitis, complicating tussis convulsiva, seemed to be benefited also during the course of the treatment. In from two to four weeks children were usually discharged cured. Appetite also was better during the course of treatment. Children with previous morbilli, also delicate ones, experienced equally beneficial results. Some cases had the treatment interrupted by a complication setting in,—*e.g.*, morbilli, pneumonia, or varicella. Relapses occurred where bromoform was not administered long enough; in some cases sleepiness was observed during the course of treatment. In a case where a toxic dose of $CHBr_3$ was given, the following symptoms were noted: Contracted, pin-point pupils; small, compressible pulse; pale countenance; cornea not reacting; on auscultation long deep inspiration; hardly any expiration was noticed; the heart-sounds were scarcely perceptible. The child reacted immediately on giving a hypodermic injection of sulphuric ether.

In the *Medical Record* for September 6, 1890, DR. LOUIS FISCHER reports sixteen cases of children treated in the German Polyclinic of New York, the majority of whom were, as a rule, poorly nourished subjects, living in tenements, in badly-ventilated rooms, and in all respects under the least favorable conditions of hygiene. In all of these cases, nevertheless, the most marked improvement and rapid cure is said to have followed the use of bromoform. The doses which he administered were the following:

For children under and up to 1 year of age, 2 to 3 drops three times a day. Children from 2 to 4 years of age, 3 to 4 drops three or four times a day, depending upon the severity of the case. Children up to 8 years of age, 4 to 6 drops three or four times a day. The doses were usually increased on the third day, and in very severe cases on the second day, by adding one drop to a single dose. The time required for a cure was variable, in some cases ten days being enough to effect a cure, while others required almost four weeks.

This remedy may be given in a small teaspoonful of water; but, as from its weight, it sinks to the bottom of the spoon, care must be taken to see that the child swallows the bromoform and that it does not remain in the spoon. As a rule, no difficulty will be experienced in giving it to children, as bromoform has a pleasant taste and is readily taken. If the bromoform turns brown, it contains free bromine, and should then not be administered.

CETRARIN.

In a paper read before the Pharmacological Section of the Berlin Congress (*Pharm. Zeit.*, August 13, p. 504), PROFESSOR KOBERT contradicted the prevalent opinion that cetrarin, the bitter principle in Iceland moss, increases the blood-pressure. From experiments on animals he found that its action is to excite movements in the stomach and intestines, while in too large doses it is anti-

peristaltic. Its beneficial influence upon patients affected with chronic constipation has also been observed by Professor Kobert. A further effect of cetrarin is stated to be the numerical increase of both red and white blood-corpuscles in the human blood, especially if their number has been abnormally diminished through sickness; and, finally, in small doses it acts as a mild stimulant upon the central organs of the nervous system. Its use appears, therefore, to be indicated in the case of chlorotics suffering from loss of appetite, constipation, and languor, the dose recommended by Professor Kobert being .1 gramme (1½ grains).—*Pharmaceutical Journal and Transactions*, August 30, 1890.

SALOL IN CHOLERA.

During the year 1889 six hundred and twelve cases of cholera occurred in the suburbs of Hyderabad, eighty-eight of which came under the treatment of Dr. Patrick Hehir. Of these, seventy-seven took place up to the end of August, and eleven after that date. In the former set of cases, the perchloride of mercury treatment was adopted, with thirty-nine deaths,—a mortality of 44.7 per cent.,—or much the same as that anticipated from any system of expectant treatment.

Happening to come across Professor Löwenthal's investigations in connection with the germicidal properties of salol on the comma bacillus of Koch in the presence of pancreatic juice, in July, as cholera was prevalent at the time, Dr. Hehir determined to put his suggestions to practical test, and he reports his results in the *Indian Medical Gazette*, No. 5, 1880.

On the 1st of August all cases admitted into the cholera hospital were treated with it. 10 grains were given to each patient every two hours, with 15 minims of spirit of chloroform; the maximum quantity given to any one case was 90 grains and the minimum 40 grains. Every case so treated recovered. The drug did not appear to produce any immediate influence, all the urgent symptoms gradually abating. Two effects, however, are stated to have been manifest,—a shortening of the period of convalescence and an absence of symptoms of uræmia.

The general effect appeared to be to prevent transudation into the alimentary canal; in fact, after a few doses the patients drank with avidity, and began to retain all the nourishing fluids administered to them. Under the influence of this increased quantity of liquid in the circulation the heart's action gained in vigor, the pulse returned, the temperature rose, the cyanosed aspect and shrunken features disappeared, and reaction was accelerated.

Dr. Hehir admits that as his cases were in the final stages of the epidemic, and as it is a well-recognized fact that the last cases of an expiring epidemic are of less severity, it is also to be expected that the mortality would be lower than if the cases had occurred in the early stage of the outbreak or when it was at its acme.

That salol is not a specific for cholera, which Dr. Hehir's results would seem to indicate, is proved by the further report, in the same number of the *Indian Medical Gazette*, of four other cases of cholera treated by salol, in all of which death took place.

ESTABLISHING TOLERANCE FOR THE TUBERCLE BACILLUS.

In the *Medical News* for October 19, 1890, Dr. Samuel G. Dixon advanced the idea that to overcome infection by tuberculosis, it would probably be necessary to produce a tolerance to the action of the tubercle bacillus, and he then advanced the following hypotheses:

First.—It is possible that, by a thorough filtering out of bacilli from tubercular material, a filtrate might be obtained and attenuated, so that by systematic inoculations a change might be produced in living animal tissues that would enable them to resist virulent tubercle bacilli.

Second.—To bring about a chemical or physical change in living tissues that would resist tubercular phthisis, it is possible that inoculations with the bacillus would have to be made; yet, before this could be done, the power of the virulent bacilli would have to be diminished, otherwise the result would be disastrous.

Dr. Dixon also stated that he had obtained success in preventing subsequent susceptibility to phthisis by inoculating animals with what he believed to be an unusual form of the tubercle bacillus, and that he had succeeded in producing a marked morphological change in this bacillus by subjecting it to different degrees of moisture, temperature, and changes in food-stuff.

It is quite impossible to state how this im-

munity was produced; yet it is quite possible that the organisms in the changed forms have not sufficient vitality to live in the animal economy, and therefore the only active portion of the matter injected is a chemical product carried in with the bacilli, and which is poisonous to the ordinary tubercle bacillus. Or, again, it is possible that the organisms themselves are antagonistic to the bacillus of Koch. It is also possible that this unusual form of bacillus produces, when in the animal economy, that which kills the tubercle bacillus. Or we can believe it possible for this new form to consume that from the animal tissues necessary for the existence of the tubercle bacillus, and by a different metabolic process to form a product non-poisonous to animal life.

From the fact that we all inhale tubercle bacilli daily without contracting phthisis, except in odd cases where there is a predisposition or where a great number of bacilli are taken into the system, we are inclined to believe that a change, either chemical or otherwise, must take place in the normal tissues before we can contract the disease. If this be so, we must aim at correcting that change, and it seems within the range of possibilities that such a correction might be brought about by a chemical substance or by stimulating the tissues by micro-organisms, harmless in themselves either through their degree of vitality or their kind.

In the *Medical and Surgical Reporter* for August 6, 1890, Dr. Dixon publishes an additional article on this subject, in which he states that he has continued his researches as regards inoculations against tuberculosis, and that he has succeeded in a number of series of inoculations of prepared virus in guinea-pigs, rabbits, and opossums, after which they had resisted matters so virulent that all animals not previously inoculated by the changed virus acquired tuberculosis when inoculated with it.

On another page of this number we publish an account of the address delivered by Dr. Robert Koch at the recent meeting of the International Medical Congress in Berlin, in which he states that he has discovered a method by which animals ordinarily very susceptible to contract tuberculosis from inoculation of the bacillus are made capable of resisting such inoculations.

Drs. Grancher and Martin, of Paris, likewise claim that they have devised a method by which similar results could be obtained. It should be noted, however, that Dr. Dixon is entitled to the priority in producing immunity to tuberculosis.

LOCALIZATION AS AN AID TO DIAGNOSIS AND TREATMENT OF SOME FORMS OF HEADACHE.

At the fifty-eighth annual meeting of the British Medical Association, recently held in Birmingham, England, DR. HEWETSON read a paper on this subject before the Section in Medicine and Therapeutics (*New York Medical Record*, September 6, 1890).

The author mentioned that for the past fifteen years he had been working upon the subject of the localization of head-pains. In 1884 he had noticed that astigmatism was a frequent cause of localized headache, and similarly he had begun to observe that each cause of pain seemed to have its locality in the cranium. Megrims, for instance, was often curable by getting the patient to make use of converging lenses. It was his observation that in numbers of cases where headache existed there was very little defect of vision present. For instance, a clergyman, who had passed with high honors in Oxford, recently consulted him for headache, and he found that this gentleman was highly hypermetropic. He had suffered much from headache, and had been treated by all sorts of drugs. A suitable pair of spectacles, continually worn, cured the patient. The brother of this gentleman also suffered from extreme hypermetropia, and was very neurotic in character. It was, the author maintained, very important to recognize defective vision as a cause of headache in childhood, for, if this were not done, the patient might suffer terribly in after-life from all kinds of ill-health. Some patients with defective vision suffered much from insomnia. In other cases, headache was due to diseases of the teeth, even when the patient suffered in no way from toothache. The regions where pain was most notable in astigmatism were the frontal region, the top of the head, and the temporal fossa. This did not resemble the vertical headache noticed in anæmia. There was nearly constant pain, accompanied by sick headache. The spot in the temporal fossa was just at the outer part of the brow. In the case of decayed upper molars in a patient with two quiescent carious upper molars, the pain was localized in the frontal region. Decayed lower molars exhibited similar painful spots at the extremity of the eyebrow.

When there were blows on the cornea, with pieces of coal or iron, the head-pain was localized in the back of the neck. It was curious that myopia did not give much pain in the head. Hypermetropia caused far more. The spasm of a microscopical eye ("accommodation spasm") caused pain in the back of the head. In this case there was temporary astigmatism. It was, then, the astigmatic eye on the one hand and the hypermetropic eye on the other which were apt to be accompanied by constant headache. In one case of epilepsy and dizziness he had quite cured his patient by means of suitable lenses.

Dr. Drummond, of Newcastle, had for some time recognized that a large number of headaches were due to defects in vision, but the results of treatment based upon this experience had not been quite so satisfactory as he had expected. Perhaps the reason of this was that the spectacles had not been worn continuously by the patients, and he supposed that they should be worn constantly. Myopia did not produce headache so frequently as astigmatism did, or as hypermetropia. The headache of influenza was noticeable. It was all over the head, and the scalp was tender. Chloride ammonium was a wonderful remedy in these cases. There was one point which must be mentioned, and that was that we must recognize a neurotic condition in almost all headaches. For instance, patients with carious teeth might be entirely free from such headaches in some instances; whereas, in others, caries would cause great and terrible suffering.

Dr. Tyson, of Folkestone, said that he had seen many cases of frontal headache associated with myopia and with astigmatism. A member said that, as symptoms of a neurotic condition, it was well to examine the carotid arteries and their pulsation. In cases of neurasthenia there was a tuberosity of the carotid vessels, and the vessels were too round and had certain other peculiarities in such patients. There were also certain muscular symptoms of neurasthenia. After a fagging night a person might be called "seedy." This referred to a dark coloration around the orbit, and to slight dropsical effusion under the sclerotic. It would be interesting, he said, if oculists would inform the profession how many of their patients with hypermetropia and astigmatism suffered from headache. He said this because there was probably some other factor in the production of the headache besides the eye-trouble, just as in the case of caries of the teeth, which caused so much agony in certain persons and so little pain in others, sometimes all the teeth might be carious and no pain exist.

Dr. Jones, of Southampton, would like to hear what effect the condition of the muscles of the eyeball had upon the production of headache. In his own experience myopic astigmatism was often accompanied by the severest form of headache. The continued use of glasses was of the greatest service in such cases. One difficulty he had found in getting such patients to wear glasses habitually was, that the patient did not see well when walking about, and was, therefore, unwilling to wear them until he gradually became accustomed to them, when he no longer felt afraid of them.

Dr. Hewetson, in reply, pointed to some other diagrams, which referred to frontal pain of nasal stenosis. This frontal pain was often accompanied by pain along the nose. This condition of the nostrils was often of the gravest importance to the health of children. Such patients were the so-called "mouth-breathers," who were incapable of breathing for a longer period than about twenty seconds through the nostrils. He referred to Dr. Lauder Brunton's localization of headache as connected with the teeth and eyes. That author localized the first class of pains in the temporal region, and the latter class in the occipital region. He repeated what he had said at Glasgow, that the slight cases were by far the most troublesome, and caused the most mischief, because they were unrecognized. There were also the cases which were fitted with improper glasses. For instance, he had not unfrequently seen patients who, being myopic, had been using plus glasses prescribed for them by vendors of glasses. General neuroses were, far oftener than was supposed, due to optical defects. Myopic astigmatism was certainly a frequent cause of headache and vertigo, and even might go so far as to cause attacks of *petit mal*.

INOCULATION A PROTECTION AGAINST TUBERCULOSIS.

The Paris correspondent of the *Lancet* for August 30, 1890, states that MM. Grancher and Martin have been engaged for the last two years in prosecuting inquiries and making experimental researches with a view of ascertaining whether or not it may be possible to

procure immunity from the danger of tubercular infection—or at least to place the system in a condition of resistance similar to that in which the previously vaccinated are in regard to small-pox, and in the case where the infection may be already an accomplished fact, to stem the inroads of the disease—by the inoculation of attenuated tubercular virus, as is now done in hydrophobia by the inoculation of weakened virus of rabies. The publicity given by Koch at the recent Congress in Berlin to his researches in the same direction has prompted the French observers to make known the results so far obtained by them in the same field of inquiry. The animal they selected for experimental purposes was the rabbit, and the method of inoculation adopted was the intravenous one, on account of the certainty with which this method sets up acute and fatal tuberculosis, with constant and well-marked lesions of the liver, spleen, and lungs. The disease thus brought about being always mortal, the observers were enabled to appreciate with tolerable precision the positive or negative results of their succeeding experiments. A tubercular culture was prepared from the spinal cords of these animals dead of tuberculosis, and attenuated after the manner adopted by Pasteur in his manipulation of rabic virus, the several preparations being numbered according to the degree of their intensity. Then, by taking healthy animals, beginning with the weakest injections and gradually going on to the stronger, it was found that after a time the animals developed a power of resistance which varied among different ones, but in most was of a kind to repel fatal infection from a virus so lethal that fresh animals inoculated with it succumbed in a short time to what was proved post mortem to be tuberculosis. For instance, seven rabbits were inoculated on December 31, 1889, with an extremely virulent preparation. Of these, one had not undergone any previous inoculation with the attenuated virus, and it died twenty-three days afterwards of the communicated disease. Five of those which had been subjected to, and thus protected by, anterior inoculations, lived 126, 176, 176, 184, and 189 days, respectively. As to the sixth, it is even now living, 229 days after the operation. In conclusion, MM. Grancher and Martin claim to have proved that, on the one hand, it is possible by inoculation to evoke in the animal economy a prolonged resistance to the most rapid and fatal form of communicated tuberculosis, and, on the other, to confer against infection by this disease an immunity, the duration of which, however, remains to be determined. They add that the results obtained by Koch on guinea-pigs, having been achieved by methods somewhat different, give ground for hope that the day is not far distant when we shall have at our disposal more than one way of effectually combating the tubercular bacillus.

THE USE OF HYPODERMIC INJECTIONS OF CAFFEINE IN THE TREATMENT OF POST-PARTUM HEMORRHAGE.

Dr. Misrachi highly recommends the use of injections of caffeine in cases of post-partum hemorrhages where rapid assistance is necessary, and especially when the physician first reaches the cases after there has been already considerable hemorrhage (*Centralblatt für Gynäkologie*, No. 27, 1890). Especially in country practice this remedy may be of great value, particularly as it is possible for the physician to have under his care cases of diphtheria or erysipelas, and to have been unable to produce such complete disinfection as would warrant the insertion of the hand. According to the author, caffeine acts more rapidly than ergot, and produces a more effective result even than ether, although the latter is a more rapid stimulant. He administered it in the form of a solution, of which a hypodermic syringeful would contain four grains of caffeine, and gave three or four injections at once,—in other words, injects hypodermically about sixteen grains of caffeine. He employs caffeine, rendered soluble by the benzoate of sodium, equal parts of each being dissolved in warm water. The author claims that this remedy so employed produces most remarkable results in arresting bleeding and in acting as a stimulant, and that, therefore, benzoate of sodium and caffeine in small packets should always be carried by country practitioners.

TRIONAL AND TETRONAL.

It will be remembered that a few months since (*Pharm. Journ.* (3), xx. p. 161) Messrs. Baumann and Kast published the results of a number of experiments made upon dogs with compounds allied to sulphonal, from which they drew the conclusions that the hypnotic action of this class is a function of the ethyl groups in the compound, and proportionate in intensity to their number, and that the SO_2 group exercises no influence in this direction. Messrs. Barth and Rumpel have attempted

to ascertain how far this statement is confirmed by the effects produced upon human patients by the administration of trional and tetronal, containing three and four ethyl groups, respectively, as compared with those produced by sulphonal, which contain two (*Deutsche Medicinische Wochenschrift*, August 7, p. 32). In order to make the comparison as close as possible, the experiments with trional and tetronal were made upon patients that had already taken sulphonal with advantage. The results obtained corresponded to the experience obtained upon dogs only so far as to show that both trional and tetronal possess pronounced hypnotic properties when administered to human beings; but they did not confirm the theory as to their quantitative action, as practically the same doses of the new compounds as of sulphonal were found to be required to produce a certain effect, instead of one-half or two-thirds, as expected. In a few cases where sulphonal was slow in its action, trional or tetronal produced a full hypnotic effect; but it was remarked that when any one of the three compounds had been administered several days in succession, a change to one of the others almost always intensified the action. At present, Messrs. Barth and Rumpel content themselves with saying that probably the indications for the use of trional and tetronal correspond with those for the use of sulphonal, but that in certain nervous conditions which are refractory towards sulphonal, the other compounds might prove more effective. Neither trional nor tetronal produced any perceptible effect upon the outbreak or course of delirium alcoholicum even when given to the extent of 4 grammes (60 grains) daily. As a hypnotic, tetronal was in fourteen cases superior to sulphonal, in six cases equal, and in four cases inferior. Trional in seventeen cases was superior, in six cases equal, and in seven inferior. No injurious by-effects were observed in any of the two hundred and twenty cases in which trional and tetronal were administered.—*Pharmaceutical Journal and Transactions*, August 30, 1890.

THE APPLICATION OF ELECTRICAL ENDOSMOSIS IN THE TREATMENT OF GOUTY CONCRETIONS.

Having ascertained that gouty concretions are in many cases medically treated with the aid of lithium salts taken internally, with the object of causing urate of lithium to be formed, dissolved, and excreted from the body, and being also informed that the difficulty met with in the treatment was in insuring that the salts so administered should be absorbed into the system, it occurred to Mr. Thomas A. Edison that more rapid success might be obtained if the application were made externally, employing the well-known principle of electrical endosmosis to carry the lithium into the tissues. This method of operation appears to offer considerable hope of success, since the lithium would be brought into the neighborhood of the concretions, and would thus be more likely to act promptly and effectively.

Electrical endosmose, as the name implies, is that property of an electrical current passing through a porous diaphragm between two solutions, in virtue of which one solution is mechanically transferred across the barrier. The current seems, in fact, to accelerate the diffusion which always takes place between solutions separated by a porous diaphragm, and at the same time acts in one direction, the solution being carried from the positive to the negative pole, from the anode to the cathode. A full description of the phenomenon is given in Wiedemann's "Die Lehre von der Elektricität."

To test the possibility of causing lithium salts to pass in this way through an animal membrane, Mr. Edison made a number of experiments, the results of which he presented to the International Medical Congress at Berlin (*British Medical Journal*, August 16, 1890).

A glass funnel of 7.5 centimetres diameter at aperture was closed by a piece of sheep-bladder .012 centimetres thick, thus providing a porous diaphragm of forty-four square centimetres area. This funnel was inverted and filled with slightly acidulated water, and a platinum wire passing down the tube formed the negative electrode. The whole was then immersed about one centimetre below the surface of a two and a half per cent. solution of LiO_2 contained in an evaporating-dish above the bottom of which it was supported about 1.25 centimetres. Immediately after immersion, a second platinum wire forming the positive electrode was dipped in the dish, and a current of one hundred and fifty milliampères sustained steadily through the apparatus for seventy-five minutes. The funnel was then removed and emptied. Its contents were mixed with a solution of $NaPO_3$, and the mixture evaporated to dryness. The residue was then treated with water to dissolve the sodium

salt and then left for twelve hours. The final precipitate was found to contain .5 gramme of $LiPO_3$.

The experiment was then repeated under precisely similar conditions except that no current was passed through the apparatus, and diffusion only could be active in transferring the salt. The analysis in this case showed that .3 gramme of lithium phosphate was present, from which it was presumed that in the previous instance the current had increased the diffusion transfer to the extent of sixty-seven per cent.

Finding the experiment succeed with a membrane, Mr. Edison next tried whether a healthy man, after being subjected to such a course of treatment as a patient suffering from concretions might be expected to undergo, would not give indications of the absorption of lithium in his excretions. In October, 1889, J. D., an active, healthy laborer, aged 20, and of one hundred and forty pounds weight, was operated upon in his laboratory. He sat in a chair, and kept his hands immersed to the wrists in glass jars, one containing a solution of two per cent. lithium chloride with a platinum electrode, and the other containing a solution of common salt with the negative electrode. The current passed through him was four milliampères, which was as much as he could conveniently stand. This treatment was continued for about two hours daily during one week, the total time of application amounting to eleven hours. His urine was collected during that week, and tests were then applied to it. Using a particular spectroscope and method, it was found that a solution containing $\frac{1}{40000}$ part by weight of LiCl in water was just detectable by a faint red band in the spectrum. No such band could under these circumstances be discerned from the urine itself, but a condensation of all the week's urine reduced to the form of chloride gave a distinct band. An evaporation of two-fifths of the total quantity of this liquid yielded on analysis .22 gramme of lithium chloride, and it was, therefore, presumed that the whole amount of salt excreted was .55 gramme, corresponding to .09 gramme of metallic lithium, or equivalent to the removal of 2.43 grammes of uric acid.

Mr. Edison next tried the application of the method to a patient suffering from an acute and typical form of the malady, in December, 1889. This person volunteered to try the effect of the method. He was 73 years of age, and had lived an active, healthy life until ten years previously, at which time, according to his own statement, he contracted the disease through sleeping in damp sheets. Concretions commencing, continued to increase slowly until they assumed large proportions. All the joints except the knees were much enlarged by atheromatous concretions. A certain degree of venous congestion was visible in his face, and incessant pain had supervened in various parts of the body during the last few months, apparently from the pressure of the calculi upon the nerves. The joints of the fingers were almost obliterated by concretion.

The girth of the little finger of the left hand was by careful measurement 8.6 centimetres, that of the corresponding finger on the right hand even greater. There was great weakness and difficulty in walking, but the mind was clear and intelligence unimpaired.

Treatment was commenced in the manner above described. The current generated from the laboratory 120-volt dynamo, passed through about five thousand ohms resistance, and entered a jar containing an aqueous solution of lithium chloride, density 1.08, in which the patient immersed his left hand up to the wrist. His right hand was similarly immersed in a solution of common salt. The current, after passing through his body, left the latter jar by a negative electrode. It was found that he could stand twenty milliampères without inconvenience, and this strength of current was steadily applied for six days during four hours daily. At the end of that time the girth of the left hand little finger was distinctly reduced to 8.2 centimetres; the patient also experienced freedom from pain after the first day's treatment. He continued the treatment for two days more during the week following, and then the journey to and from the laboratory exhausted his strength. The finger girth after fourteen days from the date of commencing treatment was eight centimetres, a total reduction of .6 centimetres. This was estimated to represent a reduction of three cubic centimetres of concretion on this particular finger, whose form facilitated accurate measurement. His general condition, beyond the weakness resulting from unaccustomed journeying, was temporarily ameliorated.

From these experiments it seems fair to conclude that satisfactory use can be made of the principle of electrical endosmose in such cases.

It should be mentioned that lithia was first tried in the bath solution, and given up on account of its caustic effects. Even an aqueous solution of one per cent. of lithia was found to blister the hands after some continued immersion. It would, therefore, have been necessary to employ a very weak solution had its use been retained, with a correspondingly lengthened course of treatment, which time did not allow of. The chloride was used in the expectation that it would be decomposed within the cuticle during the act of endosmose by electrolytic action, or that failing this it would enter into a direct combination with the uric acid.

SULPHAMINOL AS AN ANTISEPTIC.

Sulphaminol — thiooxydiphenylamine — is formed in exposing the salts of oxydiphenylamine dissolved in water to the influence of sulphur. The product obtained in this manner is a yellow powder, odorless and without taste, and readily dissolves in alkalies, and more difficultly in alkaline carbonates. It is readily soluble in alcohol and acetic acid, forming yellow salts. Exposed to heat, sulphaminol fuses at 155° C.

In contact with animal liquids, sulphaminol splits up into its two components, sulphur and phenol. As these two products possess marked antiseptic power, it is natural to suppose that sulphaminol should be suitable for medicinal use as a substitute for iodoform, without any of the disadvantages of the latter. Sulphaminol is excreted by the urine and transmitted back again into the oxydiphenylamine.

Professor Kobert has subjected sulphaminol to pharmacological experiments, which prove that it is perfectly innocuous (*Journal de Médecine*, September 7, 1890). He has found that 15 grains for every two pounds of body-weight of an animal may be given subcutaneously without any ill effect, no symptoms of poisoning or suppuration being produced, while even the appetite remains unaffected. So also sulphaminol is without poisonous properties to man.

Sulphaminol has been too recently discovered to permit of the formation of an opinion as to its therapeutic value.

Dr. Schmidt, of Frankfort, has tested it in his laryngological practice, especially in cases of suppuration in the maxillary sinus, where its employment rapidly does away with the odor which accompanies this affection.

THE PHYSIOLOGICAL ACTION OF COLCHICINE.

It was only in 1886 that the alkaloid colchicine was first obtained in a crystalline form by Houde and Zeissl independently; the drug prepared by Zeissl consisted of a combination between the alkaloid and chloroform, the latter playing the part of water of crystallization. Dr. C. Jacobi has recently published an elaborate essay on the pharmacological properties of the colchicum alkaloid, and his results are published in *Schmidt's Jahrbücher* for September 15, 1890.

He notes that about two or three hours elapses after the subcutaneous and intravenous injection of this alkaloid in warm-blooded animals before the symptoms of general poisoning appeared. In a dog and cat these symptoms first consist of nausea, and more or less vomiting and diarrhœa. Alterations in the motility, taking on the form of ascending central paralysis, soon appear and are shortly followed by disturbance of the digestive organs. When the paralysis has reached the anterior extremities, disturbance of respiration, which before then had not been affected, now appears. The respiratory movements become greatly increased in power and markedly decreased in number, until death is finally produced by arrest of respiration. In rare cases, immediately before death, convulsions occur, which are attributable to asphyxia. The heart remains beating for twenty minutes after breathing has been arrested.

On post-mortem examination there is found numerous ecchymoses and hemorrhages in the stomach and large intestine in animals in which the gastric disturbances have been most violent.

The most important result noted, however, by Jacobi is that in an absolutely pure condition colchicine is apparently inert in the frog, and it is only in mammals that it commences to act when the colorless crystalline product is transformed into a brown amorphous oxidation product, which Jacobi terms oxydicolchicine.

In the frog, $\frac{1}{15}$ grain of this product produces convulsions within half an hour, and in the frog also death results from general paralysis. Jacobi succeeded in producing this oxydicolchicine artificially through the influence of nascent oxygen on colchicine. He has found that colchicine, employed in arterial circulation experiments on an excised kidney, under the influence of the living tissue is likewise transformed into oxydicolchicine; and he has determined from experi-

ments made on separate organs that the direct action of colchicine—that is, oxydicolchicine—on the circulatory system cannot be the primary cause of death. In the frog, in doses of 1/6 grain, oxydicolchicine produces results similar to those which follow the administration of veratrine, while on warm-blooded animals colchicine oxidization produces both the same qualitative and quantitative results. First there is an irritation of the intestinal wall through stimulation of the nervous organs controlling peristalsis, and this state of stimulation finally is followed by a more or less violent gastro-enteritis; then disturbances of sensibility and alterations in the muscular functions occur, and as a consequence of ascending paralysis of the spinal cord, which finally reaches the motor centres of the medulla, death is produced by the ablation of the function of the respiratory centre.

VALUE OF THE DIAZO-REACTION.

DR. L. RÜTIMEYER, who has made between two and three thousand trials of the so-called diazo-reaction of urine from two hundred and sixty patients, declares his belief that it is a very useful guide both in diagnosis and prognosis, being especially valuable in phthisis and typhoid fever. In phthisis he regards it as denoting absorption of caseous matter, and, when it is persistent, as implying rapid mischief and an early and fatal termination. In cases of general miliary tuberculosis it was always obtained. The number of typhoid cases which were examined was eleven hundred and thirty, of which eighty-seven were fatal. The presence of the reaction is very constant, and it can generally be obtained early. It does not seem to be present in pyrexial intestinal catarrh. If the reaction is not obtained during the first or second week, the case, if one of typhoid at all, must be a very slight one. It cannot, however, be affirmed that a well-marked and constant diazo-reaction is any sign of a fatal termination, as with phthisis. The reaction is never given by the urine of healthy persons, and was not observed in hysteria, myelitis, hepatitis, diabetes, cystitis, pyelonephritis, benign ovarian cysts, cholelithiasis with jaundice, gastro abdominal catarrh with fever, or in a number of surgical diseases. It was occasionally present in cancer of the stomach and œsophagus, chronic nephritis, caries of bone, cold abscesses, pyæmia, scarlatina, pleurisy with serous effusion, tubercular meningitis, and heart-diseases. It was more frequently obtained in croupous pneumonia, actinomycosis of the lung, and malignant diseases of the peritoneum. The method of testing is very simple, two special solutions only being required, a concentrated solution of sulphanilic acid in water and a solution of nitrate of sodium of the strength of 1 in 200. The actual test solution is prepared immediately before use by mixing 200 parts of the sulphanilic acid solution with 10 of pure hydrochloric acid and 6 of the nitrite of sodium solution. This mixture is added to an equal volume of the urine, and sufficient ammonia added to render the whole alkaline. A bright or carmine-red coloration denotes the diazo-reaction. After from twelve to thirty-six hours a deposit occurs, the upper part of which is green or black.—*Lancet*, August 23, 1890.

CREOSOTE IN PHTHISIS.

In a recent number of the *Virginia Medical Monthly* the editor traces the history of the treatment of phthisis by beechwood creosote, and gives the formulæ and experiences of many distinguished physicians with the drug.

He quotes Bouchard and Gimbert (to whom belong the credit of rescuing the creosote treatment of phthisis from oblivion, after its discovery by Reichenbach, early in the nineteenth century), and suggests that 6 or 7 drops is the average daily dose, to be increased if easily tolerated. The most suitable formula is stated to be the following:

℞ Creosote, ♏xxxi;
Tincture of gentian, ♏lxxii;
Alcohol, ℥x;
Tokay or Malaga wine, ℥v. M.
Dose.—From ℥i to ℥ss.

The remarkable case of Dr. P. Bogdanovitch, who suffered from pulmonary and laryngeal phthisis, is given. For two years he took ½ grain four or five times a day without effect. "He then commenced with 4 grains daily, and increased the quantity within two months to 44 grains in twenty-four hours. The results were speedy amelioration of the cough and dyspepsia, diminution of sputum, and disappearance of fever and laryngeal spasm. The bacilli remained just as numerous as at the beginning of the treatment. He infers that 5 grains should be taken four times a day, in capsules, after food."

This heroic Russian method would hardly be adapted to the average invalid's stomach in these latitudes. Even Dr. Bogdanovitch ex-

perienced epigastric discomfort after taking small doses on an empty stomach. This symptom did not occur when over 12 grains were taken after meals. If, however, 12 grains were taken at a single dose, or 20 grains within an hour, Dr. Bogdanovitch suffered from giddiness, cardiac palpitation, weak pulse, asthenia, pallor, and anxiety. All of these toxic symptoms disappeared within an hour, and did not return.

The writer's experience with creosote in phthisis embraced seventy-three cases, including all stages of the disease.

These cases have been analyzed by MR. GEORGE FOY in the *Medical Press* for September 10, 1890. His cases are divided into three groups.

a. Those in which creosote inhalations were alone employed.

b. Those in which creosote was administered both by inhalation and by the stomach or the rectum.

c. Those in which the drug was given only by the stomach or rectum.

He concludes that,—

1. Intrapulmonary and intratracheal injections of creosote are of doubtful utility, and may be positively injurious.

2. For administration by mouth or rectum, solutions and emulsions of creosote are preferable in most cases to capsules, pills, or wafers.

3. Milk is an excellent vehicle for the administration of creosote in solution or emulsion.

4. Each method of administering creosote —viz., by inhalation, by mouth, or rectum alone, and by both these channels simultaneously—is useful, and may be partially adapted to individual cases. In suitable cases the most rapid progress seems to be made when all these ports of entry are utilized.

5. The best results for each individual attend the administration of the maximum quantity of creosote which the patient will bear.

6. The average patient will not easily tolerate more than 10 or 15 minims of creosote *per diem* for any great length of time, and many will bear only 2 or 3 drops *per diem* continuously administered.

7. It is very important that the treatment be uniform and uninterrupted.

8. Consequently an effort should always be made, if tolerance of creosote is shown by any one mucous surface to employ some other channel of introduction.

The following formula was the one commonly used :

℞ Creosoti, ʒi;
Glycerini, ad ʒiii.
Ft. mist.

Sig.—Take half a teaspoonful after meals, at bedtime, with whiskey, half to a teaspoonful, and water two ounces.

The results given from the treatment are most satisfactory, patients showing a marked increase in weight and a return of their normal strength. The difficulty of securing good beechwood creosote might be met, we think, by the use of guaiacol, which exists to the extent of sixty per cent. in good creosote.

THE ACTION OF SALOL ON THE KIDNEYS.

Salol is a drug intended to take the place of quinine and salicylic acid, which at first was recommended as entirely free from noxious properties. Its drawbacks and dangers remained to be discovered by clinical observation. It was first prepared by Von Nencki in 1883, and was introduced into practice by Sahli in 1886. It is the phenylic ether of salicylic acid, and, as is well known, can be split up into its components, phenol or carbolic acid (some forty per cent.) and salicylic acid (some sixty per cent.), by the pancreatic juice, and to a less extent by the saliva, by the action of bacteria, by organic tissues, and by alkaline carbonates. These components are eliminated from the body, probably as phenyl-ether, sulphuric acid, and salicyluric acid. Its decomposition and elimination from the body take place somewhat rapidly, for in half an hour after the administration of 30 grains of salol, salicyluric acid can be detected in the urine ; but the complete elimination of its components requires a much longer time. Four days after its ingestion (in one case five days) the dark-green or even blackish tint characteristic of carboluria is observable. The result of this slow excretion is that when salol is given continuously its components are apt to accumulate in the system, and give rise to medicinal and even toxic effects of an enduring kind. The action of salol is doubtless due entirely to the phenol and salicylic acid into which it is broken up, though Sahli surmises, from the fat-like chemical character of salol, that in large doses it may be absorbed without decomposition. Even if this were so, however, it is by no means impossible that it would be split up in the tissues, if not in the alimentary canal.

Corresponding to its composition, the therapeutic action of salol is antipyretic and antirheumatic. While some authorities maintain that it is free from all untoward effects, and even when long-continued gives rise at most to some tinnitus, others have observed somewhat disquieting results from it, attributable chiefly to the carbolic acid set free by its decomposition in the body.

Georgi, who takes up the former position, did not come upon a single case in which salol had produced unpleasant effects or complications. "In the urine I never could detect any morbid substance, and certainly no albumen, which indicated that the drug gave rise to renal irritation," he says. Von Jaksch goes further, and maintains that even when albuminuria was present it was certainly not increased by the ingestion of salol, and that consequently the drug could not act as an irritant on the kidneys. He adds: "There is, therefore, no reason against employing these substances (salicylic acid, salol, antifebrin, and thallin) in cases of nephritis." Herrlich, on the other hand, reports a case of unmistakable carbolic poisoning after the use of salol, with marked strangury, vesical irritation, and carboluria. Josefowitsch met with the case of a patient, aged 40, who had taken about three hundred and fifty grains of salol in four days, and who suffered from intense albuminuria with violent pain in the loins, only ceasing two days after the salol was left off.

It is thus seen that there is a marked discrepancy between the views of different authorities as to the danger which follows the use of salol in large doses, Kobert especially maintaining that from the large proportion of phenol which salol contains it is, comparatively speaking, a toxic substance, while Sahli regards the statements of Kobert as exaggerations and rejects his cautions as purely theoretical.

Kobert, however, insists upon the position which he has taken up, and states that the phenol which is derived from salol, whether set free in the stomach, intestines, or other organs, is so toxic a substance that any exceeding of the maximum dose must be regarded as hazardous. The maximum dose in Germany is 1½ grains at a time, or seven and a half grains in the twenty-four hours. In Austria it is given in ¾-grain doses, or two and a half grains a day.

If, then, as Kobert states, a patient is given, as Sahli recommends, as much as one hundred and twenty-three grains of salol a day, some fifty grains of phenol are set free in his body. In other words, the patient will then receive over six times the German maximum dose, or twenty times the maximum dose allowed in Austria.

As additional evidence of the correctness of Kobert's position in a paper on the action of salol on the kidneys, published in the *Practitioner* for August and September, 1890, Dr. Hesselbach reports the case of a woman in his out-patient clinic who died after a dose of 120 grains of salol.

The patient was a servant-girl, 22 years of age, who, on May 18, was seized with acute articular rheumatism. As sodium salicylate failed to produce relief, 15 grains of salol with sugar of milk was ordered every two hours. The mother, however, of the patient gave her double the quantity; in other words, two such powders every two hours, and the patient accordingly received one hundred and twenty grains of salol within eight hours. Before she received the last powder she became faint, and gave confused answers, and passed into a comatose condition, with stertorous breathing, only showing signs of sensibility by moaning when the painful joint was pressed upon. This condition continued practically unchanged for four days, when death resulted. On post-mortem examination the kidney was found to have been already the seat of chronic nephritis, but which must have been of slight character, since it had given rise previously to so little disturbance as to escape notice.

The epithelial changes in the kidney showed that from the administration of the salol acute nephritis of sufficient intensity to prove rapidly fatal was produced. In order to determine as to why, in the first place, the salol proved toxic, and, second, which of the two components of salol is charged with the toxic action,—the phenol, which was most likely, or the salicylic acid, or both together,—Dr. Hesselbach instituted a series of experiments, commencing with an investigation as to the action of the phenol on the kidney, then salol, and, finally, salicylic acid. His experiments show, in the first place, that the use of carbolic acid, in whatever form it is administered, and therefore that of salol, is contraindicated when renal disease is present.

His experiments further show that the renal changes in salol-poisoning are chiefly due to the phenol it contains, and it is only after very large doses of salol that the toxic effects of the contained salicylic acid become apparent. It is difficult, however, to determine with certainty which constituent is most

potent in producing the symptoms of salol-poisoning, as the symptoms produced by the one are not unlike the symptoms produced by the other.

The author, however, believes that the toxic action of phenol may occur more readily if the renal epithelium is already diseased. From his studies Dr. Hesselbach concludes, first, that the large proportion of phenol contained in salol renders it such a toxic substance that its unrestricted therapeutic use is fraught with danger; and, second, that in renal disease, acute or chronic, salol is contra-indicated.

Kobert's caution, of which Sahli makes so light, is therefore very far from unnecessary.

INFLUENCE OF ALKALIES ON THE EXCRETION OF URIC ACID.

Dr. Spilker, under the direction of Professor Salkowski, has made a number of experiments on himself and on a dog to determine as to whether alkalies and alkaline mineral waters diminish urinary secretion. Nitrogen was estimated by the method of Kjeldahl, and the uric acid by Leube and Salkowski's method. It was found that the ingestion of large quantities of albuminoids in man greatly increased the amount of urea, but slightly increased the uric acid. In general the proportion of uric acid to urea was, on ordinary diet, as 10 to 32.3, while with alkaline diet this proportion was changed to 12.36. As a consequence alkalies diminish the excretion of uric acid or rather its formation.

Comparative experiments made on the dog, however, gave different results. The administration of acetate of sodium increased the excretion of uric acid not only while on that diet but several days after the alkaline diet had been stopped. There is, therefore, in the dog a diminution of oxidation under the influence of alkalies.—*Repertoire de Pharmacie*, September 10, 1890.

THE ABORTIVE TREATMENT OF HERPES BY ALCOHOL SOLUTIONS.

In his inaugural thesis, presented at Lille in 1889, Dr. Dupus describes a method of aborting herpes proposed by Leloir (*Zeitschrift für Therapie*, September 1, 1890).

Professor Leloir, suffering himself from repeated attacks of herpes labialis, found that after the application of eau de Botot not only did the pain diminish in a few minutes, but that extension of the disease was prevented. Leloir states that even in the stage of erythema the use of alcohol will entirely arrest the progress of herpes within a few hours, while if the affection has extended to the formation of blisters, the arrest does not occur until within one or two days; but if, on the other hand, the stage of suppuration has been reached, the progress of the disease is remarkably shortened, the pustules shrivel up and dry with extraordinary rapidity.

Professor Leloir, according to Dupus, claims that in this manner even the most violent attack of herpes labialis, or even herpes zoster, may be cured within two to five days. Not only the cutaneous symptoms, but also the subjective symptoms, such as the pain, are thoroughly influenced by the alcohol, and in addition the burning and the neuralgia are greatly relieved.

The author gives a number of different formulæ of alcoholic solutions for this purpose, using alcohol (ninety per cent.) with two per cent. resorcin, one per cent. thymol, or three per cent. menthol. Other formulæ are the following:

Carbolic acid, one-fourth of one per cent. in alcohol.
Resorcin, three per cent. in alcohol.
Muriate of cocaine, two per cent. in alcohol.
Extract of cannabis indica, five per cent. in alcohol.
Menthol, three per cent. in alcohol.

He also recommends ten per cent. (?) tannic acid solution in alcohol with two per cent. cocaine; but in view of the cases which we have placed on record of marked symptoms of poisoning following the use of such strong solutions of tannic acid, caution should be observed in the employment of the latter formula.

INTESTINAL ANTISEPSIS IN TYPHOID FEVER.

The following is the treatment recommended by Professor Teissier of Lyons (*Lyon Médicale*, September 7, 1890):

1. Morning and evening a capsule of 7 grains of alpha-naphthol, with salicylate of bismuth.

2. Sponge once in twenty-four hours.

3. To restore the action of the kidneys after the mid-day sponging erectile injection is given of 1 drachm of the extract of cinchona and 8 to 15 grains of the sulphate of quinine dissolved in sulphate of valerian.

4. The diet is restricted to Bordeaux wine, milk, and broth.

The author states that he has employed this treatment in fifteen cases of typhoid fever, some of which were of exceptional severity, one case only dying, due to suppurative nephritis occurring at the close of the disease. In almost all of these cases complete antisepsis was realized about the fourth day of the treatment, this being recognized by the green tint of the urine, temperature depressed progressively, the albuminuria disappeared, the spleen regained its normal volume, and the tongue became moist and lost its furred condition.

After a regular fall of temperature there then occurred a series of marked thermic oscillations, lasting from four to eight days, the patient then passing to the stage of convalescence, a stage of the disease which was remarkably short. He further adds, that through all the duration of the treatment the typhoid aspect was wanting.

Reviews.

MINERAL SPRINGS AND HEALTH RESORTS OF CALIFORNIA, WITH A COMPLETE CHEMICAL ANALYSIS OF EVERY IMPORTANT MINERAL WATER IN THE WORLD. By Winslow Anderson, M.D., etc. Illustrated. A Prize Essay.

San Francisco: The Bancroft Company, 1890.

The benighted denizen of the effete East may well gaze in astonishment at the revelations of these pages. We are all willing to grant the immense advantages of California,—its gold, its scenery, its climate, its productions,—these are all part of our national pride, but here we realize for the first time that its springs—already discovered, analyzed, and found full of virtue—number one hundred and ninety-four, up to the date of the issue of this book. At the present moment, even while we write, new springs are undoubtedly bursting forth, and those previously existing in neglect are being analyzed and tested. How simple the miracle of Moses and the rock, had Moses been travelling the wilderness of California rather than the wilderness of Sinai, for anywhere he struck he would have hit a spring, and then the water would have been medicinal!

One can read this book and select his spring. That is what the book is for. He may select it either from the analysis, or from the attractive name it bears, or, in many cases, from its appearance to the eye, for the work is profusely and beautifully illustrated. If he be obese, as many celebrated men have been, there is the "Antifat" spring. Be he warlike, the "Hot Arrow-Head;" or financial in his tastes, the "Hot Bonanza" will do; or thirsty of temperament, "Cold Soda;" or hungry, "Cook's;" or if he be an anthracite baron, "Coal Valley;" or a classic scholar, the "Eureka;" or a Philadelphian, "Fairmount;" or a Mormon, "Salt Lake." For a general choice on chances give us "Skagg's," "Zem-Zem," or "Tassajava." If the searchers for springs be of happy mind, there are "Crystal" springs; if poetic, "Byron;" if going to the bad anyway, why one can try "Casa Diabolo" or "Bland's Hot Sulphur."

Having selected one's spring, by name, analysis, or artistic portrayal, the readers of the volume should study the pages in which is given a description of the general rules for using mineral springs, find out how hot the water should be or how cold, and how long he should try it. These rules will vary with the varying nature of the spring and the variety of disorder from which he suffers. Still a failure to obtain a complete cure with such an array of remedial springs cannot fail to cast a very marked suspicion upon the genuine and honest character of the disease and its possessor.

E. W. W.

RAILWAY SURGERY. By C. B. Stemen, A.M., M.D., LL.D.

J. H. Chambers & Co., 1890.

Specialism, we know, is the prevailing tendency of the present age in all the arts and sciences, and medicine has not escaped the epidemic; indeed, the latter has been very seriously attacked. Many cases have been, as in all epidemics, well marked and decidedly good; while, on the contrary, others have been positively bad cases. In the latter we would include the above work. To make a distinction between the practice of surgery in railway injuries and general surgery is, we cannot but think, making a distinction without a difference, and our reading of our author has not influenced us to the contrary. We admit that there are traumatisms, occurring in railway accidents, which may occasion special treatment, but may not the same be said of all injuries? The principles and practice are the same for all, and no surgeon who is well informed upon the laws governing general surgery needs any special instruction to treat injuries the result of railway accidents.

The views given by Professor Stemen are, in the main, based upon the general accepted

opinions of surgical writers of the present time. He advances nothing new, but judiciously advocates what experience has found most beneficial. The book is, in fact, made up from papers read by different authors at the meetings of the National Association of Railway Surgeons, and from the works of surgical writers; at least one-half or more of the context will be found within quotation marks. Thus, the chapter on "Railway Concussions of the Spine," an injury, if there is any, of a special nature belonging to railway accidents, may be said to consist almost entirely of extracts taken from Erichsen and Hammond; that on "Color Blindness," from a paper by Oliver; while Ashhurst and Agnew are freely quoted throughout the whole book.

J. H. C. S.

Correspondence.

PARIS.

(From our Special Correspondent.)

Condurango and Condurangine—The True Value of Sulphurous Acid as a Disinfectant—Danger of Insoluble Medicines—Cocaine and Opium—Parents Responsible for their Children's Doctor Bills—Influenza and Surgery—The Yelling of Microbes.

Condurango and its alkaloid condurangine have been the subjects of recent investigations conducted by Dr. Guyenot at the Cochin Hospital. The alkaloid was tried on animals only, and found to be—as Dr. Kobert announced—poisonous in small doses. But, as Dr. Guyenot remarked, the toxic effects are chiefly evident on the nervous system, the accidents manifesting themselves a long time after the administration, and increasing slightly with the dose, though not proportionally therewith. In frogs, for instance, the lethal dose is 1 milligramme ($\frac{1}{20}$ grain), and the accidents—locomotor ataxia—consequent upon the hypodermic injection will begin to appear only thirty-six hours after the operation. Such an action, at long range, as it were, has never been noticed with any other poison introduced through either hypodermic, intravenous, or intramuscular injections. This singular and characteristic property of condurangine, Dr. Dujardin-Beaumetz has suggested, may possibly be due to the fact that the alkaloid itself is not poisonous, but becomes so under the influence of some liquids of the living organism, an hypothesis to a certain extent explaining the long delay, some time being necessary for the splitting or transformation of condurangine.

As regards human patients, the drug itself was employed, and, its anticancerous virtues being more than doubtful, only in stomach-diseases, from simple gastralgia to incipient ulcers, with the following results: Condurango was found to allay and stop pain, even in ulcerous cases; to decrease and often suppress the vomitings caused by the organ's anatomical or functional alterations; to have an apparently special curative action on hæmatemesis; and, finally, to possess a most beneficial influence over the appetite and general condition of gastralgia patients. So, on the whole, Dr. Guyenot considers condurango entitled to a fair place in therapeutics as a very useful medicament in those states of dyspepsia, torpid assimilation, and imperfect nutrition, rapidly leading the patient to emaciation and cachexia. The pharmacology of condurango is simple enough. Among the different varieties offered under the same generic name, the only one to be used is the *Gonolobus condurango*, called in South America "condurango blanco." The drug may be given in the shape of powder, dose from ½ to 1 drachm a day; alcoholic tincture, strength 1 to 5, dose 2½ to 5 drachms; and a syrup made by mixing one fluidounce of tincture and three of syrup of orange-peel, dose 2 to 5 tablespoonfuls. Infusions, decoctions, and all watery preparations should be discarded. As to condurangine, a better knowledge of its properties is necessary before it can be used in human medicine.

In measure, as our knowledge of antiseptics widens, the fact becomes more evident that each disinfecting agent has its special province, and each micro-organism its peculiar antagonists. One substance alone—namely, corrosive sublimate—is known as a universal microbicide; but its highly poisonous properties and other reasons render the substitution of other antiseptics often desirable. Hence the necessity of a better insight into the exact behavior of each antiseptic with the different germs of diseases. An important contribution to this branch of science has just been made by Drs. Thoinot and Masselin, who have just completed a thorough investigation of the efficacy of sulphurous acid gas as an antiseptic. It should be explained that the experimenters, both skilful and well-trained gentlemen, had at their disposal the resources of the Pasteur Institute microbiological laboratory and the use of some vacant wards at the Charité Hospital. Owing to these facilities, they were enabled to procure or prepare the various septic agents; to test their virulence before and after exposure to sulphurous gas; to conduct the

disinfecting operation under conditions closely similar to those of current practice; and, in fine, to bring into play all the nice exactness now indispensable in scientific researches that are to stand the fire of modern criticism.

The following were the viruses tested: (*a*) Pasteur's septic vibrio; (*b*) bacterial or symptomatic charbon; (*c*) bacteridial charbon; (*d*) tuberculosis; (*e*) glanders; (*f*) typhoid fever; (*g*) diphtheria; (*h*) Asiatic cholera; and (*i*) Guadaloupe farcy. Each virus was simply exposed to the sulphurous acid in a room of fifty cubic metres (seventeen hundred and sixty-five cubic feet) capacity, tightly closed with putty. The gas was evolved in various proportions, but the quantity of sulphur consumed noted in all cases. Now, as to the results: (*a*) Septic vibrio, or Pasteur's septicæmia, was tried under four forms,—that is, as bouillon culture, dried culture, serous discharge from a septicæmic Guinea-pig, and septic powder. The last, obtained by drying the discharge to the shape of varnish on a glass plate and powdering, is exceedingly virulent. Sulphurous acid gas proved, even in large proportions, utterly powerless in all cases. (*b*) Symptomatic and (*c*) bacteridial charbon remained unaffected, as a rule, though large proportions of sulphur fumes continued for forty-eight hours will occasionally have some effect. (*d*) Tuberculosis in cultures supplied by Professor Nocard, and in the form of sputa, fresh and dried. In all cases Koch's bacillus was found to have been destroyed by a twenty-four hours' exposure to the fumes, in the proportion of 60 grammes of sulphur to the cubic metre (28 grains to the cubic foot). Even in the most refractory form, the sputa, the bacillus will be killed, but the full dose of sulphur is necessary. (*e*) Glanders; cultures of full virulence will be destroyed after twenty-four hours' exposure to the fumes of 60, and even 50 or 40, grammes (28, 23, and 19 grains) of sulphur to the cubic foot. (*f*) Typhoid fever; cultures of Eberth's bacillus from the morbid spleen. Complete destruction after twenty-four hours with 60 grammes of sulphur. (*g*) Diphtheria; cultures supplied by Dr. Roux. After twenty-four hours and 60 grammes of sulphur all Kleb's bacilli were entirely destroyed. (*h*) Asiatic cholera; the only cultures procurable being rather old, the proof cannot be said to be quite satisfactory, yet the bacilli were easily affected by even small doses of sulphur. (*i*) Guadaloupe farcy; virulent cultures of this peculiar affection of the ox, obtained from Professor Nocard, were invariably rendered inert after twenty-four hours' exposure to 60 grammes of sulphur, but smaller proportions were unreliable. To recapitulate, sulphur fumes may be considered useless with septic vibrio and charbon. But in 60-gramme doses to the cubic metre, and after twenty-four hours' contact, they may be relied upon to destroy tuberculosis, glanders, farcy, typhoid fever, diphtheria, and probably cholera germs. The germ of scarlet fever remaining as yet unknown, no experiments could be instituted. At the same time this instructive series of discriminating experiments explains why some good authorities speak so highly of sulphur fumes as an antiseptic, while other equally good authorities have pronounced them nearly worthless.

At the Lyons Medical Society Dr. Augagneur the other day related a singular case illustrating once more the danger of administering insoluble medicines. A patient, suffering from a mild type of syphilis, was some time since treated with hypodermic injections of *huilegrise*,—blue oil, if you like,—a sort of liquid mercurial ointment, made with oil instead of grease. The disease followed its regular course, and the patient was dismissed as cured. But ever since he remained liable to frequent ulcerous stomatitis; and about a month ago, having received a blow on the thigh, the place where the injections were performed, he was taken with so severe an attack of stomatitis that he had to go to the Antiquaille Hospital for treatment. There he was found by Dr. Augagneur to have two tumors, from one of which metallic mercury could be drawn by simple puncture and expression. The other tumor had to be extracted, and was found also to contain mercury. After the operation the patient rapidly recovered.

The happy results often secured by combining several medicines, complementing one another, have been observed by Dr. Tison when opium and cocaine are associated together. At the last meeting of the Association for the Advancement of Sciences he related a number of cases of obstinate vomiting treated successfully with pills containing each 1 centigramme (1/6 grain) of cocaine muriate and the same quantity of watery extract of opium. Of course some inert excipient, such as licorice or marshmallow powder, must be added to render the preparation less deliquescent and more manageable. The pills were found especially useful in the symptomatic vomiting attending such chronic affections as tuberculosis, gastritis, hysteria, and gastric dilatation. The dose is 5 or 6 pills a day, ten minutes before meals.

A case of some importance as a precedent was near the end of last month decided by the Seine civil court in favor of the medical profession. The circumstances were as follows: Drs. B. and L. B., being regularly called, attended a young man named L. during a sickness which ended fatally. The patient being insolvent,—he was living in furnished rooms,—the physicians sent the bill to the young man's father and mother as responsible for the amount,—five hundred and eighty-five francs (one hundred and seventeen dollars). This the old farmers, although quite well off, absolutely refused to pay, under the plea that their son at the time was of age, living by himself in Paris, and earning a good living. Besides, they added, they had given up all claims to his succession. The lawsuit was then begun. On giving judgment, the court held that the sum demanded was, considering the standing of the physicians and the position of defendants, fair and reasonable; that at the time of the sickness, deceased being without any means of support, was by law entitled to alimony from his parents, and said alimony included sickness expenses; and, finally, that Drs. B. and L. B. were called in by a person engaged by Mrs. L. to take care of her son during his sickness, said attendant being present during the visits and the surgical operation. Consequently Mr. and Mrs. L. were jointly ordered to pay to plaintiffs five hundred and eighty-five francs, plus interest at five per cent., and sentenced to pay all costs of action.

All has not been said, it seems, about the misdeeds plainly chargeable to our insidious enemy,—the grippe. In an important communication read before the Academy of Medicine, Dr. Verneuil has conclusively proved its nefarious influence on the result of surgical operations otherwise promising a successful termination. The cases quoted were supplied by Drs. Jeannel, of Toulouse; Liot, of Paris; Bourdy, of Le Mans; Potain; Wm. Bennett; and many other eminent surgeons, besides the instances observed by Dr. Verneuil himself. The facts were collected in such number and variety as to leave no room for doubt, but, owing to their very abundance, they cannot even be recapitulated here. Yet a single one, a typical case, observed by Dr. Liot, may be briefly alluded to. The patient was a sturdy and healthy-looking man of 60, affected with two popliteal aneurisms, a rather large one on the right side of the body, and a much smaller one on the left. On November 16 the larger aneurism was excised, and the wound, reunited by first intention, healed up without any other complication than the appearance of an eschar—the size of a 50-cent piece—on the lower and exterior part of the leg. On December 2 the man caught the influenza, which turned into broncho-pneumonia, but appeared to affect in no way the limb operated. Yet the eschar still remained adherent. The recovery from grippe was slow and tedious. On January 16, however, the patient was considered to have sufficiently recuperated to stand the second operation, which was a comparatively simple and speedy one, consisting in ligating the artery above the sac. Again healing without suppuration was secured, when, nine days later, the patient was suddenly seized with pulmonary congestion, accompanied with great cerebral excitement and painful swelling of the right knee. He died two days later,—on the 27th. At the autopsy, the left knee, the last operated on, was found intact. On the right side the popliteal cavity was healthy, but the knee affected with purulent arthritis, and along the tibio-peroneal trunk a purulent duct, leading to the eschar already mentioned. Death was caused by the lung accident. The general conclusions arrived at by Dr. Verneuil are that grippe, as an infectious disease, may have over wounds and surgical operations an injurious influence, persisting even during the convalescence from the disease proper, and manifesting itself through pyogenic tendencies, which may take various forms, such as conjunctivitis, otitis, pleurisy, peritonitis, purulent arthritis, abscesses, etc. On surgical operations its pernicious effects are leading to pyæmia, retarding cicatrization, causing suppuration in spite of all antiseptic appliances, and, in general, causing all sorts of dangerous complications. In consequence, except in cases of absolute necessity, no surgical operation should be undertaken on a patient while under the influence of the grippe. And before a person who has had the influenza be operated upon, it is necessary to wait for a perfect and thorough recovery, and to recommend for some time a tonic and reconstituting treatment, with quinine and a change of air. That influenza is a microbial disease, due to some bacillus or other, scarcely admits of doubt, although the infectious germ cannot be said to have been identified with certainty.

In fact, nowadays most diseases are indiscriminately charged to the infinitely small. Following the lead of scientists, unsophisticated people are ready to see microbes everywhere. Only their conception is rather crude. As an illustration of this popular idea, a professor was the other day relating the following

dialogue overheard in his laboratory: "Say, Alphonse," asked the boy of the head porter, "why is that water making so much noise before boiling?" Alphonse: "Why, this is Seine water. It is the microbes yelling when they feel the heat."

PARIS, September 19, 1890.

BERLIN.

(From our Special Correspondent.)

The Medico-Scientific Exhibition for the Tenth International Medical Congress, and which constituted an important part of it, was, indeed, the first international medical exhibition that was ever conducted, either at home or abroad, in such an exhaustive and perfect manner. There were whole subjects of medicine, and its assisting and kindred sciences, shown on the most extended scale; and, as the various subjects were apportioned off into their several departments, this precaution prevented crowding, and necessitated the most interesting objects being seen. I shall in the following pages briefly describe the principal subjects of pharmacology and various food-stuffs that were by no means brought near to each other, but only in a most extended manner was there any attempt made to put together different things which logically belonged so. Such a means of comparison should be particularly sought after in such an exhibition to prove the usefulness of the different objects, and, if possible, put the inventors to a most crucial test before allowing their discoveries and inventions to become part of the recognized means of therapeusis for suffering humanity. Both groups — "for new pharmaco-chemical and other medico-chemical materials and preparations," as well as "the most recent pharmaceutical materials and preparations"—embraced a collection of those medicines that have been in use for a long time, and later a number of such new chemical products as have only in part won a sure footing in therapeusis, or are still undergoing examination, with the hope of their becoming valuable additions to our list of medicines. All these materials are denominated as purely chemical bodies, as drugs whose qualities are only partly known; by pharmaceutical preparations and careful medical formulæ, in which the substances mentioned have been presented to the use of the profession. Many of them have now so advanced in reputation as to indicate that their real qualities are becoming better appreciated, and that they have attained to lasting position in public opinion.

Large collections of drugs in the rough and unprepared state as they arrive at the manufacturers were exhibited by several important firms, such as Schuchardt, of Görlitz; Brückner, Lampe & Co.; together with Schering and Riedel, of Berlin, as well as others. The latter had arranged, in a handsome, magnificently-apportioned cupboard, a complete collection of the medicines used in China, among which serpents, human fæces, and such nonsense deserve especial mention, as furnishing an idea of the basis upon which medicine stands among the sons of the heavenly kingdom, a view for which we can be only thankful to the exhibitor. The Imperial Hygienic Society, in combination with several of the larger German manufacturers and Professor Liebreich, showed a perfectly analogous collection of medical drugs of ancient, middle, and recent times. Professor Liebreich had added for this purpose the collection of the Pharmacological Institute of the Berlin University. Schimmel, of Leipsic, Gehe, of Dresden, Merck, of Darmstadt, and others had here combined their collections of world-wide reputation. Moreover, the Imperial Hygienic Society had added many mounted microscopical preparations of different kinds, numerous preparations, both wet and dry, for bacteriologico-chemical examination, the most approved incubators, etc., all contributing to a magnificent collection. The objects put on exhibition by Professor Liebreich aroused special interest. With the introduction of chloral hydrate, first exhibited by him, commences in medicine the use of such organic bodies, which are here shown in the most artistic manner. Of especial interest was the exhibition of a new preparation,—a lanolinum humanum,—which deserved especial notice. Moreover, Jaffe and Darmstädter, the exhibitors of lanolin,—a preparation that has now become most common in Germany,—had a most tasty arrangement of it in its various forms. Many manufacturers, specially engaged in the preparation of certain medicines, had contributed their parts in sending their exhibits under the forms of crystals, powders, and other shapes. Zimmer, of Frankfort, and others had over a dozen different preparations of quinine, besides arlcolin, ecgonin, catoin, paracatoin, dicotoin, leucotin, etc. Knoll exhibited codeine and diuretine; Fahlberg, saccharin; Bayer, aristol, sulphonal, phenacetin; Riedel, antipyrin, sulphonal, and salipyrin. A collection of Dr. Helbing, of London, was very striking, as it

presented many rare vegetable preparations, with their imperfections and adulterations. There were numerous medicines in compressed pastille form, as well as in that of keratin-coated pills. Yet both these methods of preparation are not entirely free from objection. With the exception of the pastilles of corrosive sublimate here exhibited, the others, according to Angerer's statements, are in practice very objectionable, because they are so hard to dissolve in water. Again, the tablets, to be carried in the pocket, with the pastilles of the compressed acetate of morphine, each containing one per cent. of the drug, and the other useful medicines, in this form, are not entirely free from objection, because the physician must needs dissolve them himself, and for this purpose requires absolutely pure water, which, at present, must rank as an objection, as this commodity is not to be found in every household. The keratin-coated pills, which are not soluble in the gastric juice, but the intestines, by this means bring the medicines they contain in contact with the chyle, which then produces its effect, and might easily lie in the folds of the intestines undissolved, and then pass, in this condition, into the rectum, to be discharged with the fæces.

The soap that lately has attracted attention, especially in dermatology, was exhibited in its liquid state by various firms. The use of medicines in the form of soft soap has certainly a great future in the treatment of skin-diseases.

Creolin was exhibited by Artmann and Pearson. It is to be hoped that Schulke & Mayr, of Hamburg, will verify in regard to sysol, the latest antiseptic, the reputation that has preceded it,—viz., that it is active and not poisonous. Later this discovery may contribute to the purification and the free introduction of its use in soaps. Seabury & Johnson, of New York, had very beautiful recent plaster preparations. Steinkauler, of Frankfort-on-the-Main, exhibited paraffine, both liquid and solid, as well as preparations of vaseline, among which latter was fresh yellow, viscous, natural vaseline. There were exhibited Stephan's suppositories, of the most varied kinds, for the treatment of acute and chronic diseases. Besides suppositories for the treatment of urethral and prostatic disease, there were also those for cervical, nasal, œsophageal, anal, uterine, and rectal treatment, and these, too, arranged for the application of various medicines in the most approved styles. The fine inner metallic coating, which insures elasticity and readiness to these preparations, is first protected by a firm outer covering, which at first hardens, and then, after its introduction to its destined place, dissolves and produces the desired effect. The medical preparations for journeys in the tropics, as introduced by the Royal Commissioner Wissmann, were exhibited by Kade, an apothecary of Orange. Simon's drug-store had sent an arrangement for a country physician, and which contained every necessary instrument and medicine for inland journeys. Moreover, the first department embraced, in addition, the most useful inventions for chemical and bacteriological research, for the analysis of urine, the examination of sputa for tubercle bacilli, as well as for drinking-water and the contents of the stomach.

To describe all the other medicines and preparations exhibited by various manufacturers, and, to an extent, at the suggestions of physicians, would be impossible in a general sketch. Still, I shall mention a few important subjects in the group of natural preparations, that were represented in great completeness.

Peptones were to be seen in numerous quantities, such as sterilized animal peptone and the chalybeate peptone of Dendeyer, of Brussels, dry animal peptone and the animal peptone of Kemnerverisch and Koch; albuminous preparations of peptone, of Antweiler; the same preparations in combination with beer (Ross & Co., of Kleinflottbeck), cocoa, chocolate; and a liquid bovinine by Bush, of London. Aleuronat, a plant albumen, by Handhausen, of Hamm; an extract of beef-tea, by Maggi; essences of beef, veal, mutton, and chicken, and other excellent meat-teas, by George Moson, of London, these latter being, on account of their refreshing and strengthening properties, highly to be recommended to invalids and convalescents; capsules of beef-tea and of peptonized beef-tea, by Quaglio; the Leube-Rosenthal solution of meat, by Wahrburg, of Jena; powdered meat for the preparation of beef-tea, by Schiller, of Liban; vegetable butter, by Petty & Co., of London; cremain, a condensed cream, by Cremain Aktiebolaget, of Stockholm; powder of condensed milk, sterilized milk, by Drenckham, of Holstein; vegetable milk, by Hewel & Veithen, of Cologne; together with an innumerable collection of infant foods, some celebrated and some not so well known, by Loefflund, of Stuttgart; as well as Neave, Kufeke, Liebe, Mellin, of London, Meyer, of Berlin, Petrocchi, of Toscana, Reuss, Timpe, Nestlé, and others. The Hygienic Institute of the University of Breslau, under the management of Professor Flügge, had on exhibition various important tests for sterilized and other kinds

of milk, in vessels with different patent sealing arrangements. Some of these were already injured from long keeping, others looked very inviting. In each vessel there was an empty space (shake space) above the milk, where it had become partially churned from the unavoidable tossing that it had received. All these methods for the serving and preserving of milk plainly showed that, in spite of the advertisements of the various firms, the milk prepared by them does not fulfil the high claims made for it. A new apparatus for the sterilizing of milk, by Newhauss, Gronwald & Oehlmann, of Berlin, trials of which have been made in the Imperial Hygienic Society, seems, after all that has been heard so far, the most perfect method that has been presented on the subject. The preparations for managing it in the exhibition are very complete. Besides this, there were many other apparatuses for the sterilizing of milk. There were also other apparatuses belonging to the subject of therapeusis,—models, instruments, rests for the sick, chairs for making examinations and performing operations, collections of preparations, the varied display of the medical department of the Imperial Prussian minister of war, etc. All these can only be mentioned.

This exhibition will remain in the memories of the visitors to the Congress as the only one of its kind. May it fulfil to the highest extent all its high aims, to the healing of the sick and preservation of the well.

BERLIN, September 15, 1890.

ON THE VALUE OF HOT AND DRY AIR.

To the Editor of the THERAPEUTIC GAZETTE:

DEAR SIR:—In the THERAPEUTIC GAZETTE, xiv. 550, you quote Dr. Sehrwald's conclusions regarding the action of hot and dry air on the temperature of the lung. In the eighth paragraph he says,—

"The opinion of Halter that the bacilli of tuberculosis are destroyed after subjection for short intervals to air at a temperature of 105° has never been demonstrated," and concludes with the statement that "the employment of hot air in the treatment of tuberculosis" should be done away with.

That tuberculosis cannot be permanently benefited by any short treatment of hot air is doubtless true. But in Southern California it has been repeatedly demonstrated that this disease is unable to withstand the effect of a permanent treatment of warm and dry air, such as our climate affords to the invalid, except in cases where the disease is far advanced. Dr. King, I believe, has reported on nearly two hundred cases which came under his personal knowledge at Banning, a small station on the Southern Pacific Railway, and the larger proportion of these *fully recovered*, a large number were visibly benefited, and the disease was arrested in all but one or two per cent. of the cases, where tuberculosis was too far advanced to be hindered.

These two hundred or more cases were reported in all the stages of the disease, and several who had been given up at their old homes, and only hoped to obtain a brief respite from death, seemingly recovered wholly. Upon their apparent recovery several of these returned to their old homes, and survived but a few months, while others, who were in less advanced stages, were permanently cured.

Banning is at an elevation of about two thousand two hundred feet, I believe, on the eastern slope of the San Gorgonio Pass, and subjected to the warm dry winds of the Colorado Desert. It is, therefore, peculiarly situated even for Southern California towns, and evidently has superior advantages for this class of invalids.

At San Diego tuberculosis is invariably arrested and cured in the earlier stages, and it is only to our equable climate and the dryness of our atmosphere that this seaport town can claim any peculiar advantages over other sections of the country.

Tuberculosis never originates under such climatic conditions as here exist, and in confirmation of this I would refer to the valuable contributions to this subject from the pen of my valued friend, Dr. P. Remondius, of San Diego, a member of the International Medical Congress, who has made a special study of the subject.

While San Diego is sure to permanently benefit all mild cases, patients in a more advanced stage are often advised to seek some interior point, away from our moist seabreezes, and where, as has already been shown, as is the case at Banning, even the most desperate cases are visibly benefited or at least arrested.

The great depressed basin known as the Colorado Desert, portions of which are over three hundred feet below sea-level, is especially adapted for these more advanced cases. The temperature on this desert in summer is perfectly dry, and often attains 140° F., or even a higher mark. In this pure atmosphere tuberculosis *cannot exist*, and the most ad-

vanced disease seems to quickly succumb, and to leave the patient in the full enjoyment of his faculties as long as he may choose to reside in this region. The native Indian is accredited with here attaining to an age of exceeding one hundred and fifty years, though no white man has yet attempted a residence in this region for that period of time.

Sometimes a patient, after full recovery in this rather dreary region, seeks to return to his old society on the coast or in the East,—a decision which usually proves quickly fatal if acted upon. This seems to prove my opening proposition that any short treatment of hot and dry air must prove ineffectual, if not even detrimental, in cases of tuberculosis.

The many cases already on record, however, prove that Dr. Sehrwald's last proposition is an erroneous one, but the employment of hot air should be continuous in this disease,—a condition that only the Colorado Desert most nearly furnishes. I believe that this region is destined to become the great sanatorium of the world for the treatment of lung-diseases, and while at first it may seem dreary and desolate to the pioneers, yet life among the warm and really invigorating breezes which here hold sway among the palm-trees will prove sweet to the invalid.

Those in less advanced stages will recover wholly, and parents who have children for whom they are anxious will find here a home where the young can compete on equal footing with their naturally stronger companions.

C. R. ORCUTT.

SAN DIEGO, CAL.

[Our correspondent does not appear to have appreciated the gist of the communications which he quotes. The discussion to which he refers does not deal in any respect with the value of different climates in the treatment of phthisis, but as to whether the inhalation of air at any temperature can succeed in raising the temperature of the air *within* the lungs to a degree sufficient to prove fatal to the life of the tubercle bacilli.—ED.]

SUBCUTANEOUS INJECTION OF QUININE.

To the Editor of the THERAPEUTIC GAZETTE:

DEAR SIR:—My attention was attracted by an article in the GAZETTE, August number, page 560, upon "The Subcutaneous Injection of Quinine." It is a practice I have followed for a number of years without knowing it was so little used, until reading the article above mentioned.

Upon looking up dates, I find my first case was in the fall of 1869, antedating Kobner one year; hence I was a pioneer in the practice, if not the leader.

The amount injected by me far exceeds that by either Kobner or Bacelli. They only used a one per cent. solution. My usual single dose is 7 or 8 grains, repeated every eight to twelve hours, until three or four are given.

The solution is prepared by taking 25 grains for three injections, or ½ drachm for four. The quin. sul. is put into a clean half-ounce vial, aq. pura, one drachm, is poured upon it, then acid. sul. dil. is added drop by drop until the solution is nearly clear. A few more drops of the dilute acid are usually required than there are grains of quinine. If the quinine precipitates, ten or fifteen drops more of water are added. To be sure there is no excess of acid, the solution is left still turbid by the undissolved quinine. When ready for use, the bulk will be about two drachms. Before using, the solution and syringe are warmed over a lamp. About two syringefuls are required for one dose. I unscrew the barrel from the needle, and let the needle hang while the syringe is refilled. This saves the pain of one puncture. Air, of course, is carefully excluded. I used to get one sore in every three or four injections, but considered it nothing where life was in such jeopardy. During the past year I have given a dozen injections to two patients without producing a sore, which I attribute to using less acid and completing the solution by heat.

CASE I.—September, 1869, Miss N. S. was prostrated by malarial poison. She had a stomach that would not tolerate quinine at any time, and now she was vomiting upon the slightest provocation. After days of failure to settle her stomach, I gave her three hypodermic injections of quinine with the happiest effects,—viz., retention of food and rapid recovery. A year later, the same conditions arising, the same treatment was adopted with the same favorable result.

CASE II.—Twelve years ago I was called to see Miss O., whom I found suffering with malaria. Her stomach rejected all food and medicine. After eleven days of fruitless effort, during which time her stomach did not retain a spoonful of nourishment, I gave her 25 grains of quinine in three hypodermic injections. Her stomach settled after the

first dose, and she was virtually well in two days.

CASE III.—Mr. W., of bilious temperament and subject to bilious attacks, over four years ago was sick most of the winter. Being anxious to get to business, he got out the 1st of March. Being weak from sickness and tender from confinement to house, he was unable to endure the weather, and in a few days came home with one of his bilious attacks and a pneumonia of the right lung. His stomach refused medicine and food for twelve days. I persuaded him to allow me to inject quinine into his arm, and gave 25 grains, with ¾ grain of morphine, in three doses. In one hour after first dose he drank a glass of eggnog. When I went to give the second hypodermic, eight hours after the first, I found resolution had begun in the hepatized lung. (*Query.*—Did the quinine and morphine cause the resolution?) After resting one day, 30 grains more, with 1 grain of morphine, were given in four doses, and a case that was considered hopeless by his friends made a rapid recovery.

I am satisfied, if this plan of treatment were more frequently employed in malarious districts, many lives would be saved.

Very respectfully,

G. A. HARMAN, M.D.

LANCASTER, OHIO, September 9, 1890.

RARE COMPLICATION OF WHOOPING-COUGH.

To the Editor of the THERAPEUTIC GAZETTE:

ROBERT MEADE SMITH, M.D.

DEAR DOCTOR:—I see that Dr. Ellis, of Livermore, Ky., reports in your last number of the GAZETTE a case of a rare character, which seems to be the only case of the kind that has been reported, at least in a long time.

As to the nature of the tumor, it was, without doubt, *an emphysema.* The sudden onset, the "rustling sound, similar to that produced by crushing soft paper in the hand," shows it to *have been air.* Furthermore, the very fact of there "being no discoloration of the skin," neither "any pain," and its having come on during a "severe paroxysm of coughing," and by its "disappearance after death," all go to show it was *air.*

Dr. Ellis wishes to know, "How air could get there?" I quote from as high authorities as Professors S. D. Gross, Trousseau, and Geo. B. Wood, as to the way that air makes its way from the lungs to the neck, breast, or entire body.

Dr. Gross says, in writing of "Interlobular Emphysema," that "occasionally the air escapes into the cellular substance of the mediastinal cavity, where it is either arrested or it *extends up the neck* and *forms tumor*, which sensibly crepitates on pressure" (see "Elements of Pathological Anatomy," 1839, vol. ii. p. 61).

Trousseau says (in his lecture on whooping-cough) that "the air diffused between the lobules of the lung makes its way along the roots of the bronchi, and gives *rise to a subcutaneous emphysema*, which spreads, more or less rapidly, along the trachea . . . and crepitates in a characteristic manner when pressed. . . . Such an accident is grave, and generally terminates fatally. It is fortunately rare" (see Trousseau's "Clinical Medicine," vol. ii. p. 132, P. Blakiston & Co., Philadelphia, 1882).

In vol. ii. (Lippincott, Grambo & Co., Philadelphia, 1852) p. 56 of Professor Geo. B. Wood's "Practice of Medicine" you will find about the same explanation of this rare complication of whooping-cough; and Professor Wood here states, "That no doubt but the emphysema in this case depends on some solution of continuity in the air-cells or bronchial tubes *that cannot be detected.*"

Also Coats says, under the head of "Interlobular Emphysema," ". . . It may pass to the root of the lung, and from there up along the *trachea and out to the subcutaneous tissue of the neck*, and so lead to surgical emphysema; and *this has in some cases led to a mistaken diagnosis*, as Virchow has pointed out" (see "Manual of Pathology," by Joseph Coats, M.D., Lea Brothers, Philadelphia, 1883, p. 475).

Last, and not least by any means, on p. 71, vol. ii., of "Reynolds's System of Medicine," Hartshorne, Lea Brothers, Philadelphia, 1880, under the head of "Interlobular Emphysema," says, "Air extravasated into the connective tissue of the lung occasionally finds its way into the posterior mediastinum, and thence *into the subcutaneous tissue of the neck, face, trunk, etc.*"

So from the above authorities it would seem that it is a complication that has long been recognized by the profession.

I hope the above will clear up the case more perfectly.

I am, yours sincerely,

CHEVES BEVILL.

WINFIELD, ARK., August 26, 1890.

To the Editor of the THERAPEUTIC GAZETTE:

DEAR SIR:—Dr. W. P. Ellis's case, as reported in the August number of the GAZETTE, page 567, is, to say the least, unusual.

As far as the diagnosis is concerned, I will have to differ from him, granting it was either an emphysematous or sanguineous tumor, one of which it doubtless was.

The doctor says it was about two hours in forming. Now, I submit, if a quantity of blood equal to the size of the tumor described had left the circulation of a child of 7 or 8 years in that time, he would have been pretty well exsanguinated. But the doctor says there was no perceptible pallor.

Again, it had almost disappeared on the sixth day. I can hardly imagine a hæmatoma of that size disappearing by absorption in so short a time.

And, again, the slight dysphagia would be strong presumptive evidence against a blood clot. It would be sufficiently firm to interfere materially with deglutition, and respiration as well. And, again, the crepitation or crackling sensation imparted to the touch would negative blood clot, while it would favor emphysema. In fact, to my mind, all the signs are opposed to blood clot.

WM. A. MCCOY, M.D.

MADISON, IND.

Notes and Queries.

CASE OF POISONING BY "WILD MELONS."

In the *Australasian Medical Gazette* for June 15, 1890, MR. J. FRANCIS SOUTER reports the case of a child who was poisoned by a species of Cucurbitaceæ, which is abundant in New South Wales, which is ordinarily known as the "wild melon."

The patient was a child three years of age and of robust constitution, and was noticed by the parents to be feverish and unwell at eleven o'clock in the morning, at the same time complaining of nausea. This condition continued for some hours, vomiting of watery fluid taking place once or twice. At about four o'clock in the afternoon the child had a convulsion, the eyes rotating upward, and foaming at the mouth.

When Mr. Souter was sent for he found the child comatose, the teeth slightly apart, with the tongue pushed against them, the eyes fixed, with "pin-hole pupil," quite insensible to light. The pulse was 140, the temperature 98° F.

The child was given a warm bath, when it again vomited a large quantity of fluid containing the skins of several melons. As soon as the child was removed from the bath the pupils again contracted. Two grains of calomel and teaspoonful doses of brandy were given frequently, and in a short time a profuse perspiration ensued, after which the patient slept for four or five hours, and on waking seemed perfectly well.

DETONATION OF TABLETS COMPOSED OF CHLORATE OF POTASSIUM AND CHLORIDE OF AMMONIUM.

The mixture of the above-mentioned salts, which has been in use for some time as a popular remedy for mouth and throat affections, has been viewed with suspicion, as a probable source of mischief on account of the decomposition resulting between them.

After a few weeks, chlorine compounds are evolved, noticeable by the odor, and by the effect on the organic material which may be in contact with or near them.

If the quantity of the tablets is large, sufficient heat may be generated to cause spontaneous combustion, should circumstances favor it.

In the *American Journal of Pharmacy* for August, 1890, MR. CHARLES BULLOCK writes that a lot of the tablets, more than a year old, were removed from the small bottles in which they are usually put up, and four ounces of them placed in one bottle and finished for delivery. While standing undisturbed, a loud explosion occurred, and the bottle containing the tablets was almost pulverized, the concussion breaking several other bottles in proximity, although they were protected by pasteboard cases.

The cause of the detonation may be looked for in the formation of chloride of nitrogen, as one of the results of decomposition between the salts.

DEATH FROM AN OVERDOSE OF PARALDEHYDE.

The Dublin correspondent, writing to the *Lancet* for August 20, 1890, says, "On Sunday evening week a patient in the Fever Hospital attached to the Cork Workhouse died from the effects of paraldehyde. The deceased, Bridget O'Brien, aged 20, was admitted suffering from typhoid fever, and but slight hopes were entertained of her recovery.

As she was suffering from violent delirium and sleeplessness, a hypnotic was prescribed, and the temporary nurse, acting for the ordinary nurse during leave of absence, whose name was Horgan, was instructed, both verbally and in writing, how to administer the medicine. The patient getting worse, Horgan overlooked the directions she had received, and, instead of giving 1 teaspoonful, unfortunately administered the entire contents of the bottle,—viz., from 6 to 7 teaspoonfuls. In about five minutes O'Brien fell into an unconscious state, and, despite medical assistance, remained in that state for hours, when she died. Horgan, it may be added, had done similar duty as temporary nurse in the most satisfactory manner during the past three years, and was a paid official of the hospital. She stated that, in the excitement caused by the delirium of the patient, she never looked at the label on the bottle. The quantity of paraldehyde that was administered is not mentioned, but it may be supposed the deceased girl took from six to seven drachms. The resident medical officer of the workhouse, in giving evidence at the inquest, is reported to have said that weakness of the heart's action was accelerated by the overdose. This appears strange, as it is usually believed that paraldehyde, instead of weakening the heart, like chloral, strengthens it, and diminishes its frequency. It is for this reason that it is especially valuable in the insomnia of cardiac affections. The coroner's jury returned a verdict that death resulted from failure of the heart's action, accelerated by an overdose of medicine administered while in a weak condition from fever. Horgan has been arrested, bail being accepted, and the trial will take place at Douglas Petty Sessions."

TESTS FOR ALBUMEN IN URINE.

Dr. Zouchlos recommends (*Wien. Allgem. Med. Zeit.*) the following as convenient side tests for albumen in the urine: A few drops of a mixture of 1 part of acetic acid, and 6 parts of a one per cent. solution of sublimate, when added to urine containing albumen, produces a slight cloudiness. Peptone, when mixed with acetic acid and sublimate in the above-mentioned proportions, causes no cloudiness, and this is true also of uric acid, solution of urea, phosphates and sugar. When the urine is much concentrated, it does not become cloudy on the addition of sublimate and acetic acid. Another method which is still more exact—even more than that with the ferrocyanide of potassium and acetic acid—is the method with rhodanide of potassium and acetic acid in the cold. It is best to mix one hundred cubic centimetres of a ten per cent. solution with twenty cubic centimetres of acetic acid, and to add some drops of this mixture to the urine to be tested. When albumen is present in small quantities, a distinct cloudiness occurs immediately on the addition of the above-mentioned mixture; when the amount of albumen is large, a thick white precipitate is thrown down. An excess of the fluid does no harm. Normal urine, when thus tested, invariably gives a negative result. The most convenient method is that with rhodanide of potassium and succinic acid, which can be carried about in the solid form in boxes. Equal parts of succinic acid and rhodanide of potassium are mixed together, and a small quantity is added to the urine. If even a small amount of albumen be present, cloudiness is produced.—*Druggists' Circular and Chemical Gazette*, August, 1890.

THE RELATIVE GERMICIDAL POWERS OF DISINFECTANTS.

According to some researches carried out by a Berlin bacteriologist, even corrosive sublimate is not the powerful and absolute germicide that it is supposed to be, and his observations bearing thereon are interesting, because only the possession of undoubted antiseptic properties can be held to justify the use of such a dangerously-poisonous agent. He found, for instance, that the vitality of anthrax spores under certain circumstances was not destroyed even after twenty minutes' immersion in a one per thousand solution of the salt, and animals inoculated therewith died of splenic fever. The inefficacy of solutions of carbolic acid has long been proclaimed, and in the course of his researches this observer found that after thirty-eight days' immersion in a seven per cent. solution of the acid, anthrax spores were still capable of growth and of infecting animals. With respect to boiling-water, one minute's immersion was totally inadequate to prevent further development, and two minutes did not preclude the cultivation of the spores in agar. It was only after five minutes' boiling that their career appeared to be cut short. It is a curious point that in the case of boiling-water the spores would grow after they had

proved harmless to animals, whereas with sublimate the opposite occurred. The loss of power to develop, therefore, does not involve the inability to infect animals, and the latter test has, therefore, been made the criterion of perfect disinfection. Passing over the details, he found that chlorine was by far the most reliable disinfectant and germicide, a watery solution containing a .2 per cent. of the gas destroying in fifteen seconds the infectiveness and power of growth of the bacilli. To cleanse the hands, he recommends a paste consisting of 100 parts of "chloride of lime" with 45 of water, to be smeared on as with an ointment, the hands to be then rinsed in a two per cent. solution of hydrochloric acid. The great objection to conclusions based on the foregoing observations is, that the experiments bore on only one variety of micro-organism, and we have no sort of assurance that the bacilli with which we have more commonly to deal are correspondingly amenable to the various germicidal agents.—*Medical Press and Circular*, August 20, 1890.

DIPHTHERIA OF THE MEATUS URINARIUS.

At the fourth annual meeting of the American Association of Genito-Urinary Surgeons, Dr. F. Tilden Brown reported the case of a young man, 19 years of age, of delicate constitution, and free from any venereal disease, in whom diphtheria developed in the meatus urinarius after the performance of circumcision. This case, which is reported in the *Journal of Cutaneous and Genito-Urinary Diseases* for August, 1890, possesses the following points of interest:

1. The novel manner of inoculation; dirty cotton, upon a site—the meatus urinarius—not commonly the primary one in genito-urinary diphtheria.

2. The rapid development (thirty-six hours) of a considerable wax-like mass consisting wholly of various bacteria.

3. The non-appearance of disease in the circumcision wound, proving that the instruments and dressings concerned in the operation were not the channels of infection.

4. The subsequent limitation of the disease to the meatus and glans penis,—*i.e.*, first, the successful protection of the circumcision wound by carefully applied antiseptic dressings; second, the non-involvement of urethra and deeper urinary organs, and that this extension was presumably opposed by the physiological barrier of normal acid urine, Billroth and others showing that vesico-vaginal and urethral diphtheria following operation wounds and accidental abrasions requires for its development and maintenance, besides the exposure to specific infection, an alkaline condition of the urine.

A READY MODE OF PREPARATION OF ARISTOL.

The price of aristol is a serious objection to its substitution for iodoform, but in the *Répertoire de Pharmacie* for August 10, 1890, M. Boule proposes a formula, which he has adopted, as offering a ready and much cheaper method of manufacturing this compound than the process ordinarily employed.

His method is to dissolve 3 parts each of crystallized thymol and caustic soda with 5.8 parts of iodide of potassium in 50 parts of distilled water, by the aid of gentle heat. After it has cooled, the solution is mixed with 250 parts of a concentrated solution of hypochlorite of sodium (Labarraque) and well shaken. Aristol is then precipitated. In about a quarter of an hour it may be thrown on a linen filter, washed with distilled water, and dried in the dark.

HYPODERMIC ARTIFICIAL RESPIRATION.

At the meeting of the Academie de Médecine, Dr. Cobos (*La France Médicale*, August 22, 1890) proposed the hypodermic administration of oxygen under the skin, the oxygen so administered being rapidly absorbed by the capillaries, and thus acting as a substitute for the normal pulmonary oxygenation of the blood.

THE CURABILITY OF MYXŒDEMA.

Early in 1890, Mr. Victor Horsley suggested that the conditions known as myxœdema and sporadic cretinism might be made curable by transplanting healthy thyroid tissue into the victims of these diseases.

It seems now that this idea was forestalled in 1889 by Dr. Bircher, who gives an account of myxœdema and cretinoid degeneration in which most valuable results were obtained by the transplantation method. He describes a case of acute myxœdema in a female patient in whom unintentionally the whole thyroid gland was removed. Severe myxœdema (cachexia strumipriva) resulting. Dr. Bircher,

on January 16, 1889, transplanted into the abdominal cavity a portion of apparently (*ziemlich*) normal thyroid tissue from a goitre. The effect of this operation was to produce a very marked improvement, so that the patient was enabled to return to work, and the myxœdematous symptoms in great measure disappeared, only the condition of the skin suggesting the persistence of the malady. Three months later, however, it became evident that the transplanted piece of thyroid had atrophied, as the myxœdema again showed itself and progressed. A second transplantation was made, and again an improvement, and this time greater, resulted, as the patient was fairly well for nine months, even menstruation returning after amenorrhœa had persisted for over a year. At the present time the symptoms have recurred slightly, but the beneficial effect of the operation was thus indubitably established.

In the *British Medical Journal* for July 26, 1890, Mr. Victor Horsley writes that he has recently learned from Professor Kocher that in 1883 he attempted to obtain the same result by transplantation of a small portion of the gland freshly excised from a goitre, but the graft was soon absorbed. When he heard of Dr. Bircher's case, however, Professor Kocher took up the subject again early in 1889 by transplanting in two cases the half of a thyroid gland "in the abdomen," fixing it to the wall by sutures. In both the gland was "aseptically exfoliated" after some time. In three cases he put the gland loose in the abdominal cavity. The results of these cases Professor Kocher has not yet collected nor published, but he has already learnt that one patient has greatly improved since the operation.

Consideration of these results Mr. Horsley thinks thus proves that this operation should be performed not only in cachexia strumipriva, but also in myxœdema and sporadic cretinism. Whether or not, however, it is better to transplant thyroid tissue from a human goitre or a healthy gland from a lower animal can only be decided by experience.

REMOVAL OF A PORTION OF THE LIVER BY THE ELASTIC LIGATURE.

M. TERRILLON has just placed on record an interesting case in which a portion of the liver was removed by means of the elastic ligature. The patient was a woman, aged 53, who for some four years before she came under observation had suffered from a painful swelling situated in the right lobe of the liver. An exploratory puncture revealed the presence of a small quantity of liquid resembling that of an ordinary hydatid cyst. In consequence of the puncture the tumor diminished somewhat in size. However, the author performed laparotomy, making an incision along a line parallel to the false ribs on the right side, exposing the tumor, and, with the object of avoiding hemorrhage, he placed an elastic ligature around the swelling. At the end of seven days the sphacelated portion, with the ligature, was removed, the wound, of which the base was formed by hepatic tissue, being separated from the peritoneal cavity by firm adhesions. Cicatrization was complete at the end of six weeks, the patient making an excellent recovery.—*Medical Press and Circular*, September 10, 1890.

"BRADYCARDIA," OR SLOW ACTION OF THE HEART.

The cases hitherto recorded of "slow heart" (see THERAPEUTIC GAZETTE, December, 1889, and January and June, 1890) and the inferences derived from them are not altogether satisfactory, as many errors have arisen owing to the pulse having been only taken at the wrist and not compared to the apex beat. E. Riegel has made observations on one thousand and forty-seven patients whose hearts beat less than 60 times per minute. Such a condition he terms "bradycardia." He divides his cases into two large groups: 1. Physiological bradycardia. By this Riegel understands a slowing of the heart's action, caused by, or in connection with, some physiological condition. Under this head would come the "slow heart" occurring in puerperal states, also that which is found in cases of starvation, and, finally, the bradycardia which is sometimes observed as a constitutional peculiarity. Riegel here remarks that many of the cases of this kind which have been reported are greatly open to question, as some of them were obviously due to some pathological cause. 2. Pathological bradycardia. There are several varieties under this head: (*a*) The slowing of the pulse noticed in convalescence from a febrile affection. More than a quarter of the whole number of cases were of this kind. They were most commonly observed after recovery from croupous pneumonia; then, in order of frequency, after typhoid, erysipelas, and acute

rheumatism. Traube attributed this phenomenon to a state of general exhaustion. (*b*) Bradycardia in diseases of the digestive tract. In this division were three hundred and seventy-nine cases. It was most frequently noticed in affections of the stomach (ulcer, carcinoma, and dilatation). Such a result might have been inferred from physiological experiments; for in animals an increase of arterial tension with diminution in frequency of the pulse takes place when the stomach is submitted to electric, mechanical, or thermic excitation, and is caused by a reflex action of the vagus. The slow pulse of icterus probably depends on the paralyzing action on the cardiac ganglia by the bile acids in the blood. When occurring in cases of peritonitis, the bradycardia is probably of the nature of those cases described in the first division. 3. Bradycardia in diseases of the respiratory organs. In this class were eighty-seven cases. Some of them were during convalescence from pleurisy; others after hæmoptysis, or after the withdrawal of a large pleural exudation. 4. Bradycardia in cases of disorders of the circulatory organs (forty-seven cases). This phenomenon appeared in fatty degeneration of the heart and when the coronary arteries were ossified, but it was never found as a constant symptom of any one disease of the heart; it more often occurred when the heart was flabby and insufficiently nourished. 5. Slow heart in diseases of the urinary organs (sixty-four cases). Acute nephritis was the most common disease in which it was found; the slowing of the pulse was always accompanied by increase of arterial tension, and was often the earliest sign of the retention in the blood of the urinary constituents, thus denoting the commencement of uræmia. 6. Bradycardia as a result of poisoning. Riegel noticed it in three cases of lead-poisoning and in five cases of chronic alcoholism. 7. A pulse under 60 per minute was noticed in twenty-seven cases of anæmia and chlorosis, in one case of extreme anæmia after lead-poisoning, and in three cases of diabetes. 8. Bradycardia in diseases of the nervous system (ninety-three cases). In many of these cases it was thought to be due to reflex vagus action. In some instances of disease of the central nervous system it was probably caused by direct vagus action; in others Riegel ascribed the symptom to disturbances of the circulation and blood-pressure in the brain; and in the remaining number of cases no definite action could be distinguished. 9. Bradycardia in other diseases. Under this head were seventeen cases of extreme fatigue and exhaustion, one case of sunstroke, twelve cases of skin-diseases, and seventeen of painful affections of the muscles.—*Lancet*, September 13, 1890.

JAMES A. LYDSTON, M.D., Ph.G., late chief of Eye and Ear Department, Pension Bureau, Washington, D. C., has been elected to the chair of Chemistry in the Chicago College of Physicians and Surgeons.

TREATMENT OF CHOLERA.

The chief medical officer of the Spanish army has published in the *Revista de Sanidad Militar* an article on cholera, in which he indicates the treatment that is, in his opinion, most satisfactory. When cholera is epidemic all cases of diarrhœa ought to be attended to, and treated by means of large doses of subnitrate of bismuth. He would also give thirty grains or more of subacetate of lead in four ounces of distilled or boiled water as an enema after each loose evacuation. In cholera no food should be given, but plenty of acidulated water (without sugar) and ice. Enemas of seltzer-water and champagne are useful. Soup, milk, jelly, and toast-water are worse than useless as long as the kidneys do not act, as they only serve as culture liquids for the pathogenic microbe in the intestines. Bismuth is useful in helping the fæces to form more or less solid masses together with the septic products of the small intestine, and so retarding absorption in the large intestine. If the stage of asphyxia or general infection comes on, he advises recourse, if possible, to oxygen inhalations. Failing these, or as additional methods of medication, rectal etherization and a dose of antipyrin, administered either hypodermically or per rectum, may be tried. Other means, such as rubbing, hot-water bottles, hypodermic injections of ether, alcohol, caffeine,—or of morphine when there is vomiting,—though useful, must be considered entirely subordinate to those first mentioned, of which the writer regards the inhalation of oxygen as the most valuable. In order to treat the kidney-affection, which is so frequently the cause of death, warm baths and poultices must be used, and when cerebral symptoms develop ice should be applied to the head, and leeches to the mastoid processes.—*Lancet*, September 13, 1890.

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